

Once Upon A Time

Lecture by Jasia Reichardt, for the 'Cybernetic Serendipity: Towards AI' event,
at the Institute for Contemporary Arts, London, 24 February 2024

There are three roads to what we started calling 'media art'. One of them takes us through a synthesis of the arts: music, theatre, dance, visual arts, and film. Another road takes us through the processes of making copies and reproductions. A third road takes us there through experiments enabled by computers.

I shall confine myself to this third road.

Everything starts with history, and I have two topics.

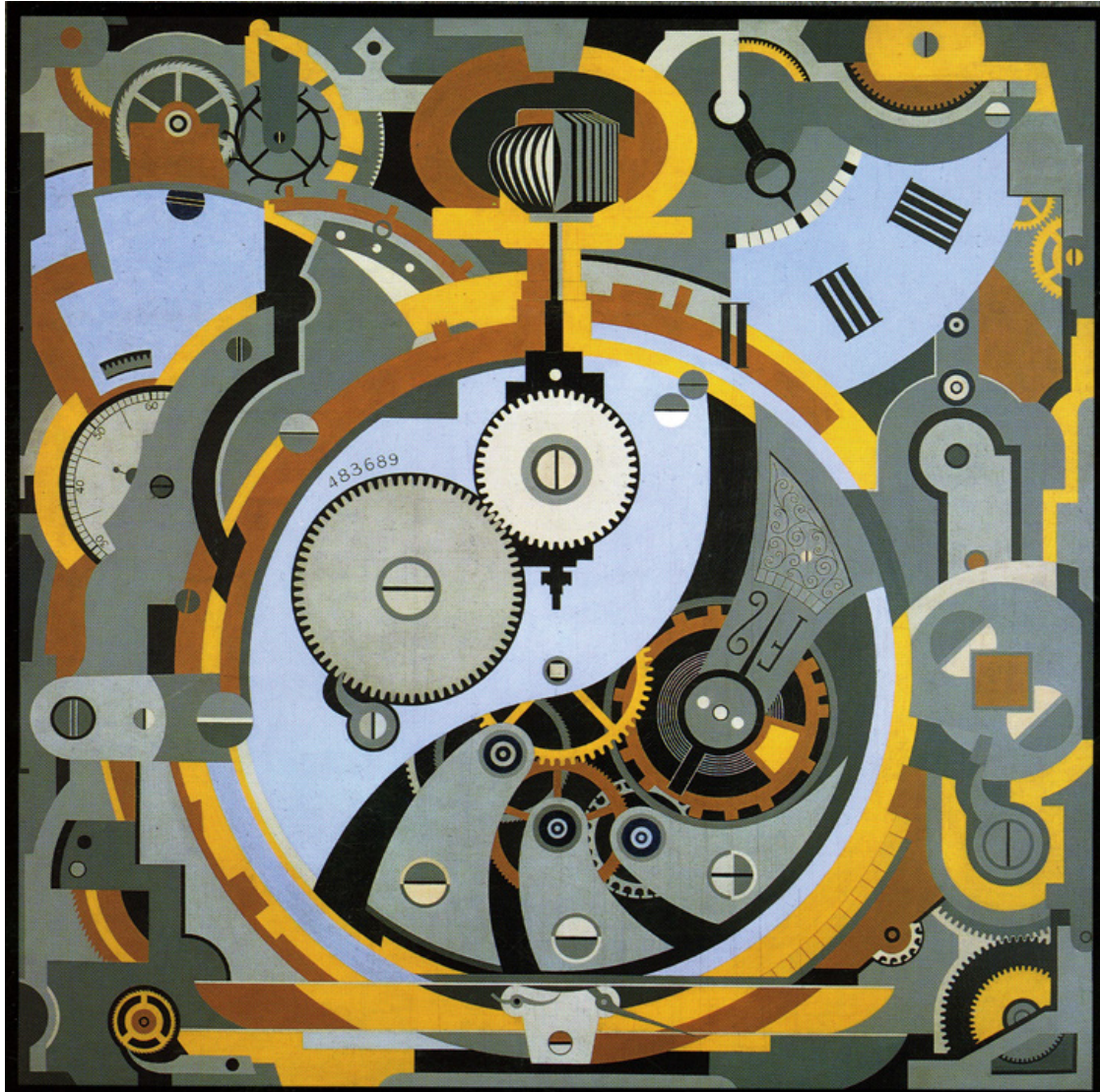
One: how during the past 60 years, artists involved with technology and its possibilities gradually moved from works that are finite and concrete, to those that can be endlessly reconfigured and/or are virtual.

Two: how the new media, and above all the computer, and its programs, allowed people who had never considered themselves to be artists to produce works of art.

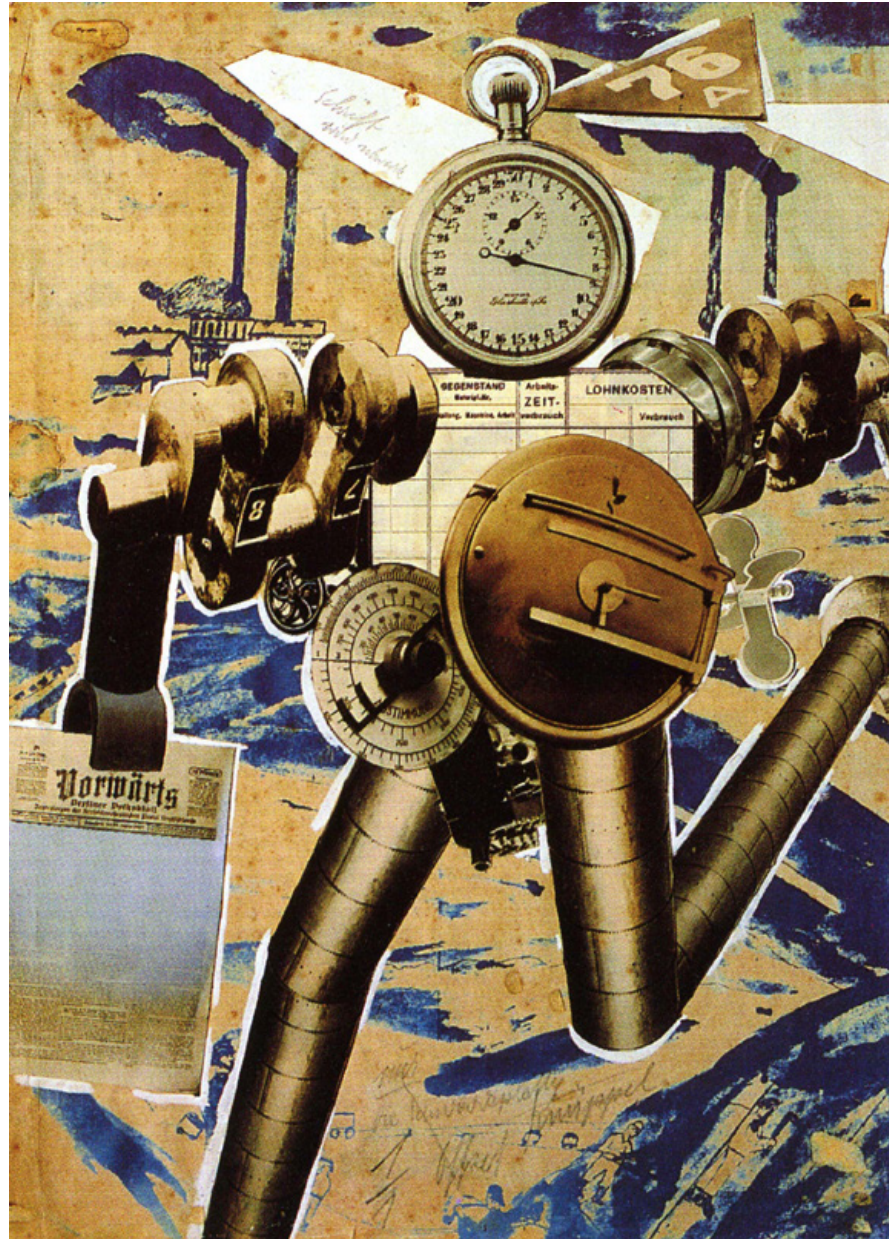
In the 20th century, artists celebrated technology in different ways. First of all by depicting machines, and later by using them as tools and assistants, even collaborators. Nobody yet has thought of machines as competitors, but the 21st century is still young and AI is ambitious.

First, I'm going to say something about the sort of work that led up to *Cybernetic Serendipity* – paintings and kinetic art.

I start with artists who made pictures of machines, like Gerald Murphy who painted this watch in 1925. What we see is what is behind the clock face. The things that make it function.



Paintings and collages of the 1920s are full of gears, wheels, pistons in movement. This is one of John Heartfield's anti-Nazi collages of 1927 from *Der Knüppel*. The machine spells danger.



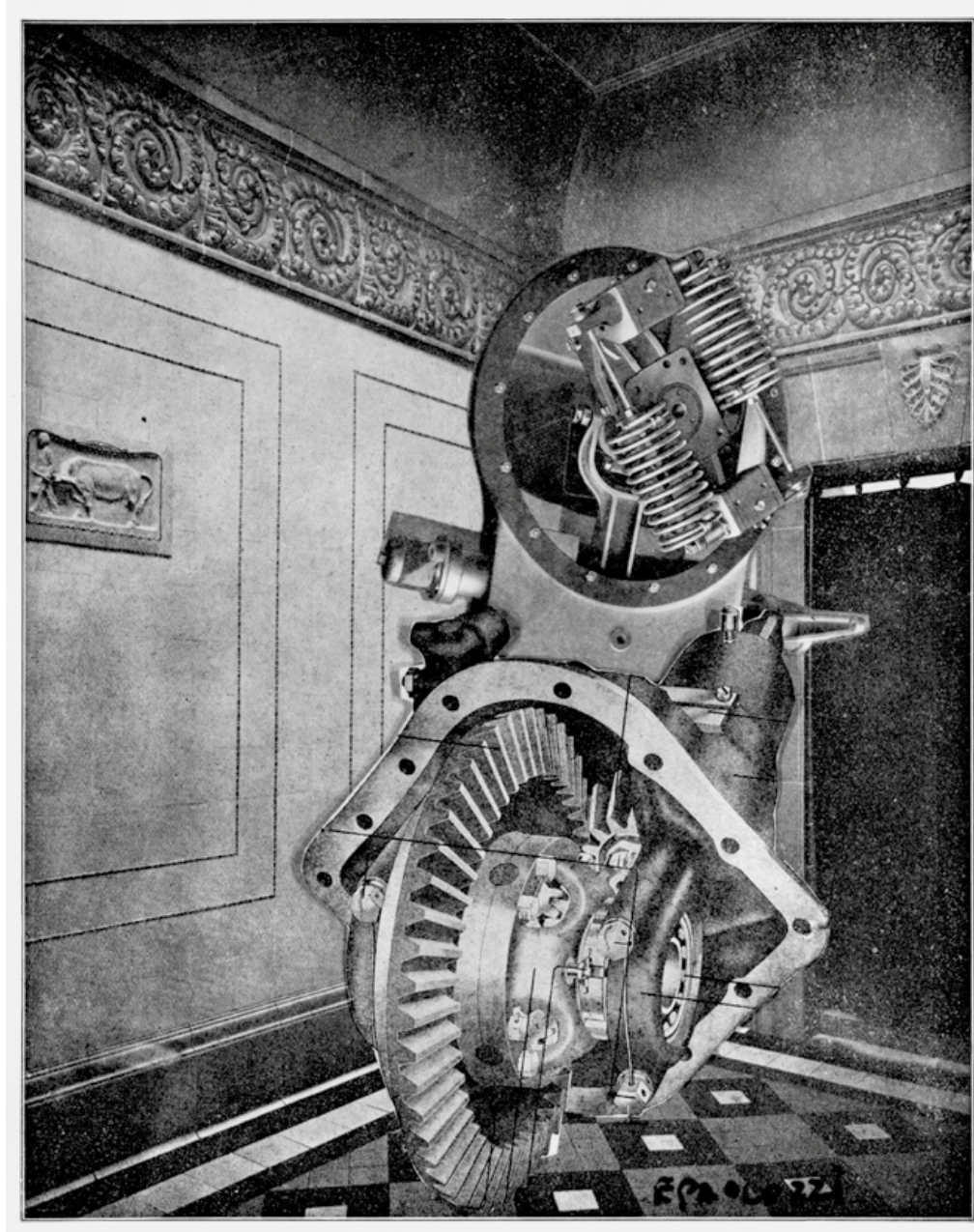
Machine images came from Japan, America, and Europe. Some are closer to design, like the black and white image by Louis Lozowick



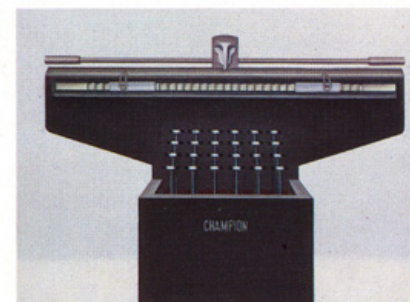
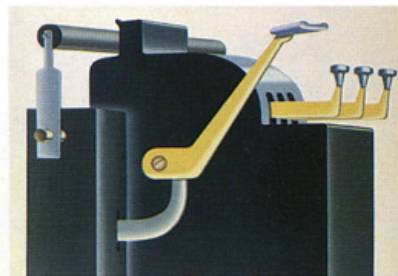
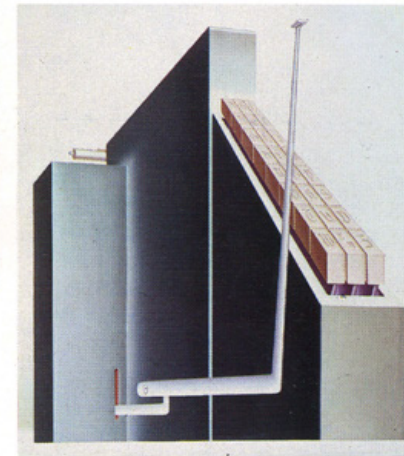
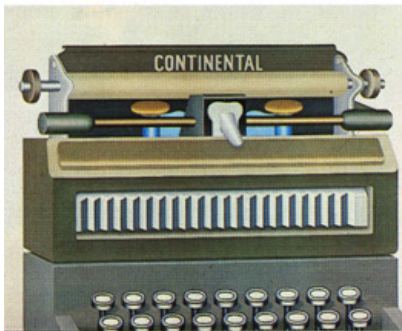
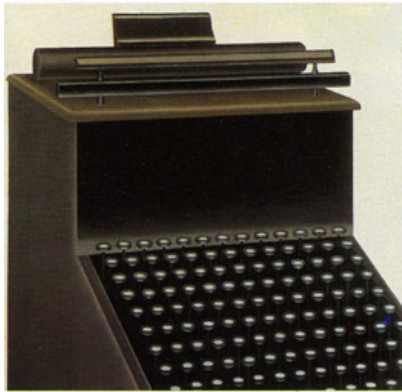
and the painting of Kazuo Sakata, called surprisingly enough: *Woman with a pot of flowers*. Both are from mid-1920s.



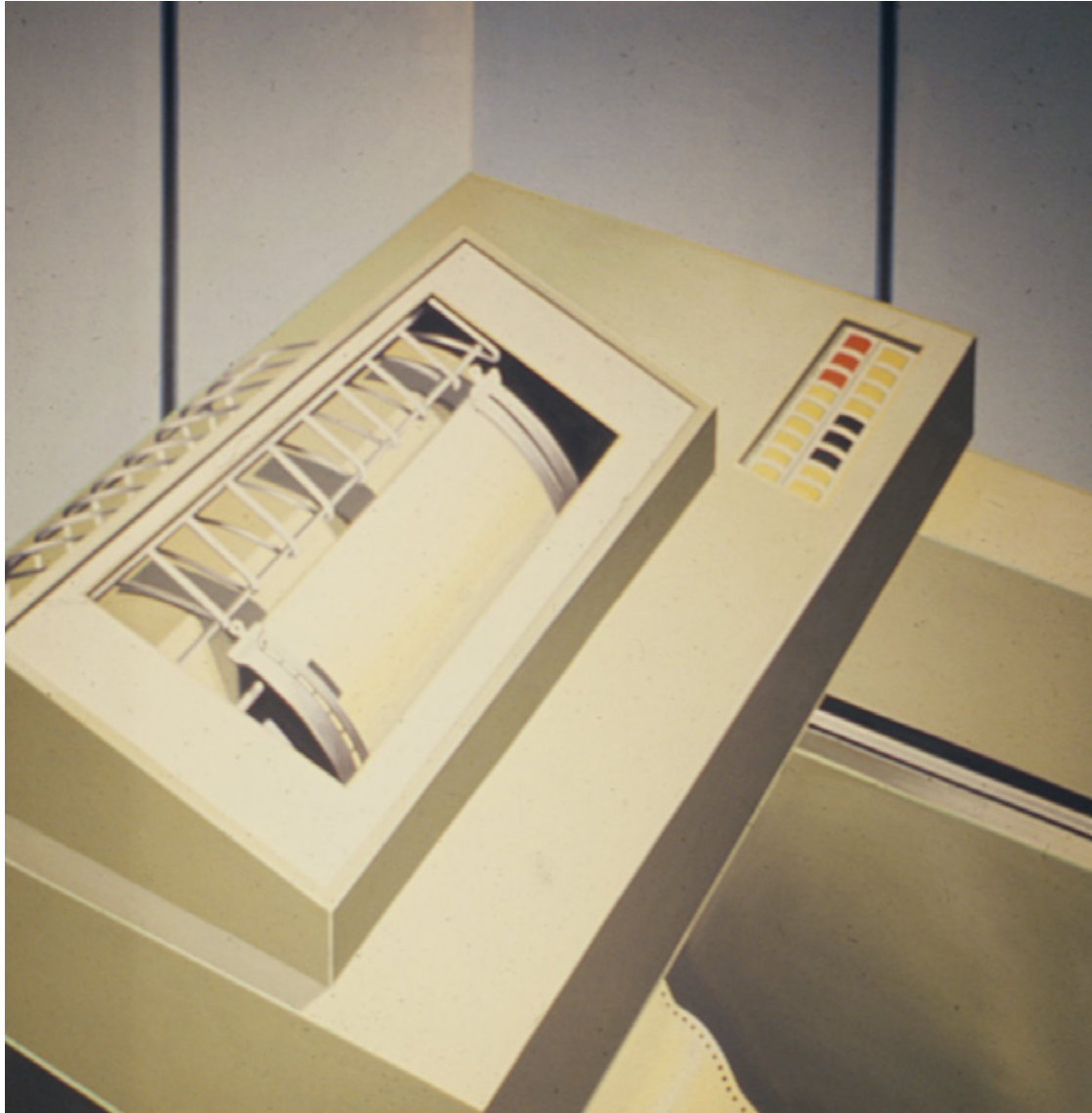
Paolozzi's collage from his *History of Nothing* series, is also about the complexity and magic of the machine's interior. But soon enough things change, and as machines become more complex so the depiction of them concentrates on the exterior.



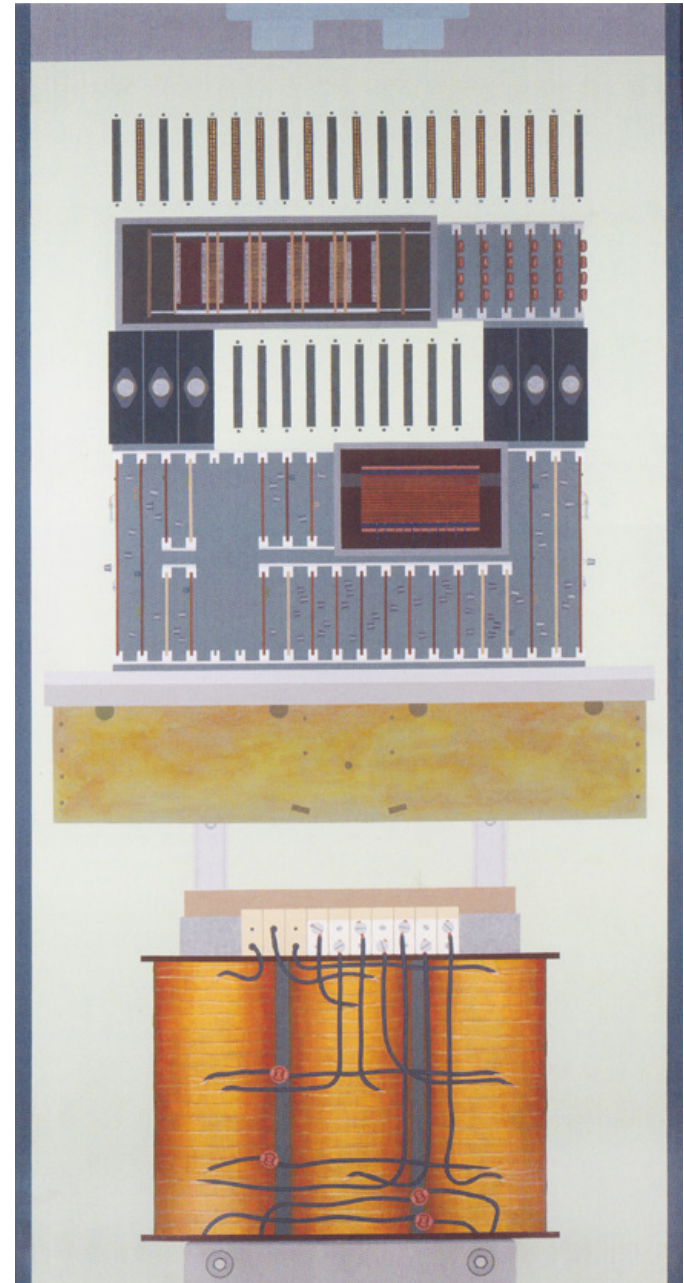
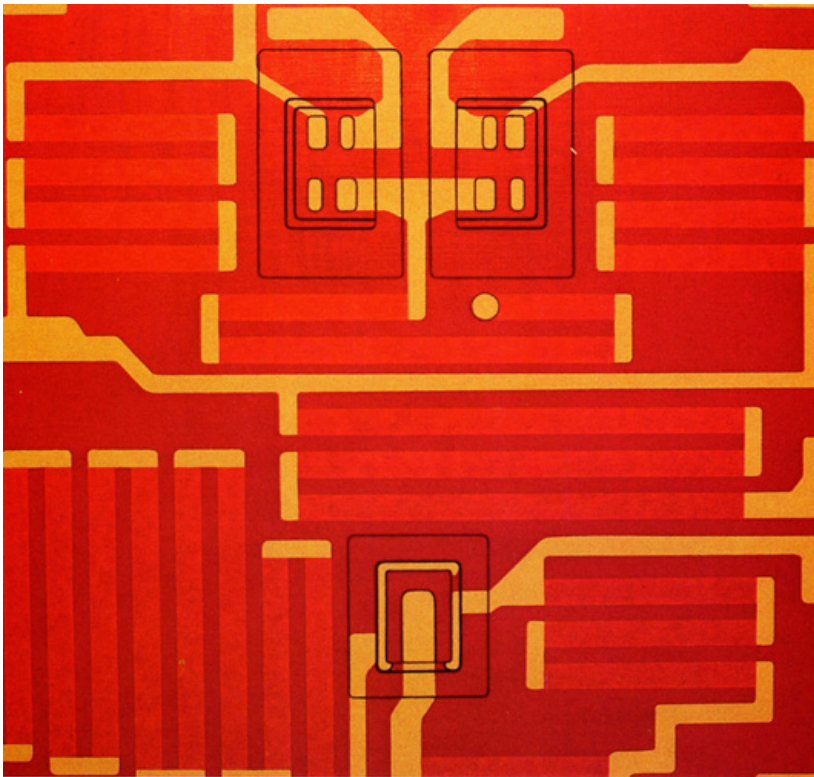
This is already the case with Konrad Klapheck's parade of machines, most of them from the 1950s. Instead of cogs and wheels we see the machines' exterior. We look at them from the outside. The way these proto-imaginary machines function may be already too complex to represent.



Lowell Nesbitt, painted portraits of computers during the 1960s. Exteriors only. They are smooth, streamlined and with little detail. This is a portrait of *IBM 1440 data processing system*.



Exceptionally, these two Ulla Wigger's paintings are about machine interiors. (The red one is a micro-circuit and the blue one a channel selector.) Their date is 1967. Both are reduced to a simple diagrammatic form.



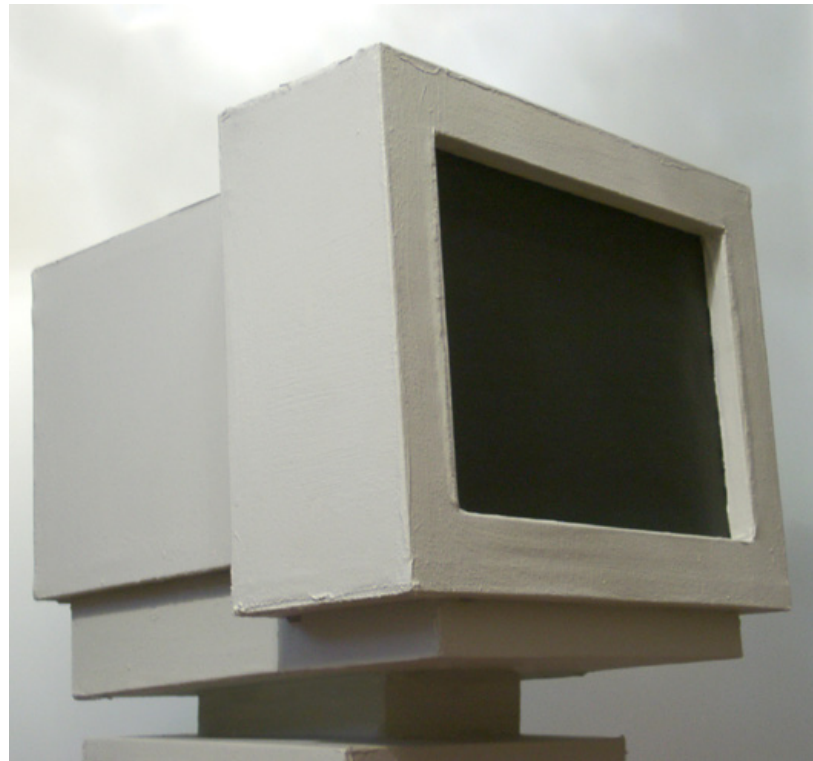
Artists painting computers in the 1980s, in whatever style, continued to deal with their external appearance. This painting by Mark Kostabi is called *The Connection*.



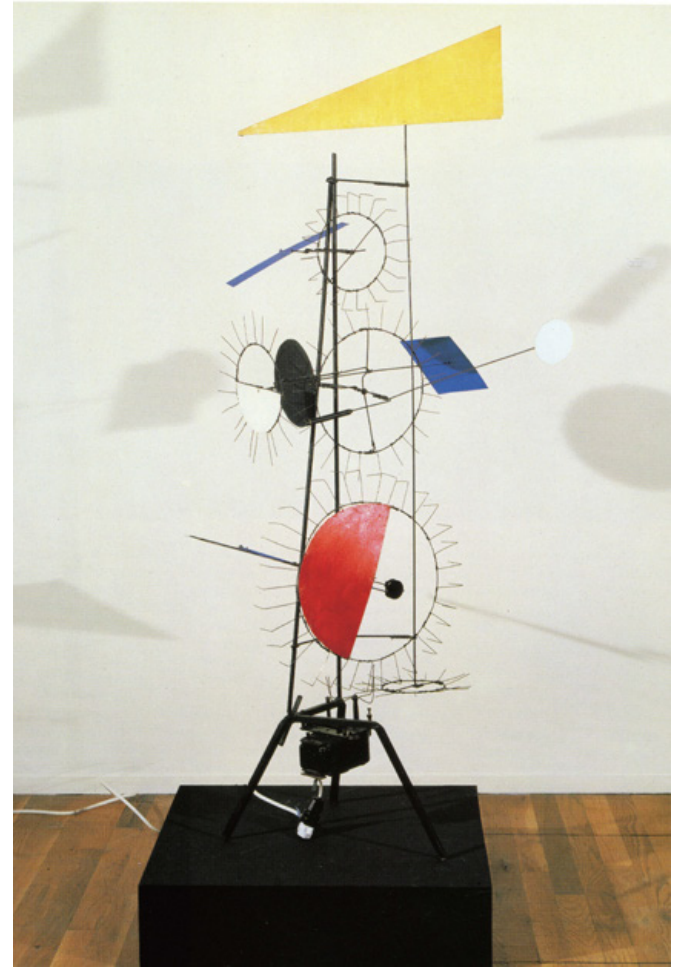
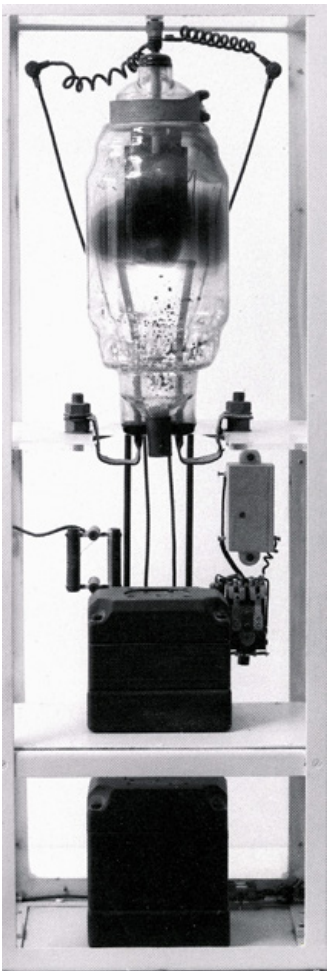
Keith Haring treats the computer as a sound-and-image-producing machine that is a personage. It is not being operated by a human, it is a creature in its own right. The painting has no title and the date is 1984.



Later, Armin Wagner produced this work, called *Screen Monitor*, which he considers to be a painting rather than a sculpture, emphasising its flatness. He points to the fact that the exterior of the computer offers little visual interest.

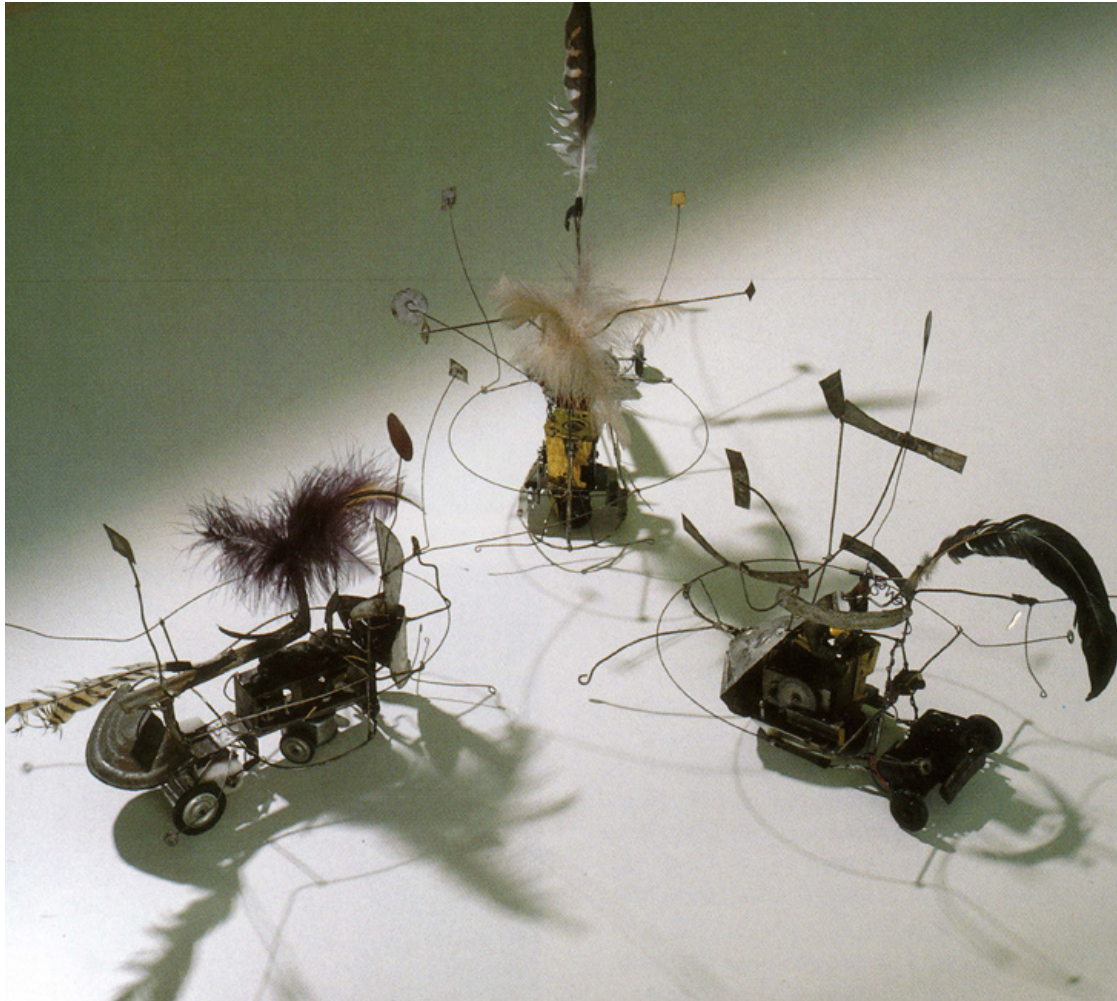


Another phase of artists' involvement with technology is, of course, constructions in motion and performing machines. Here we have a work by Tinguely, his *Large meta-mechanical sculpture*.



Above, is *Télélumière* by Takis. Components are motors, batteries, lights, magnets and timers. Both sculptures perform random movements.

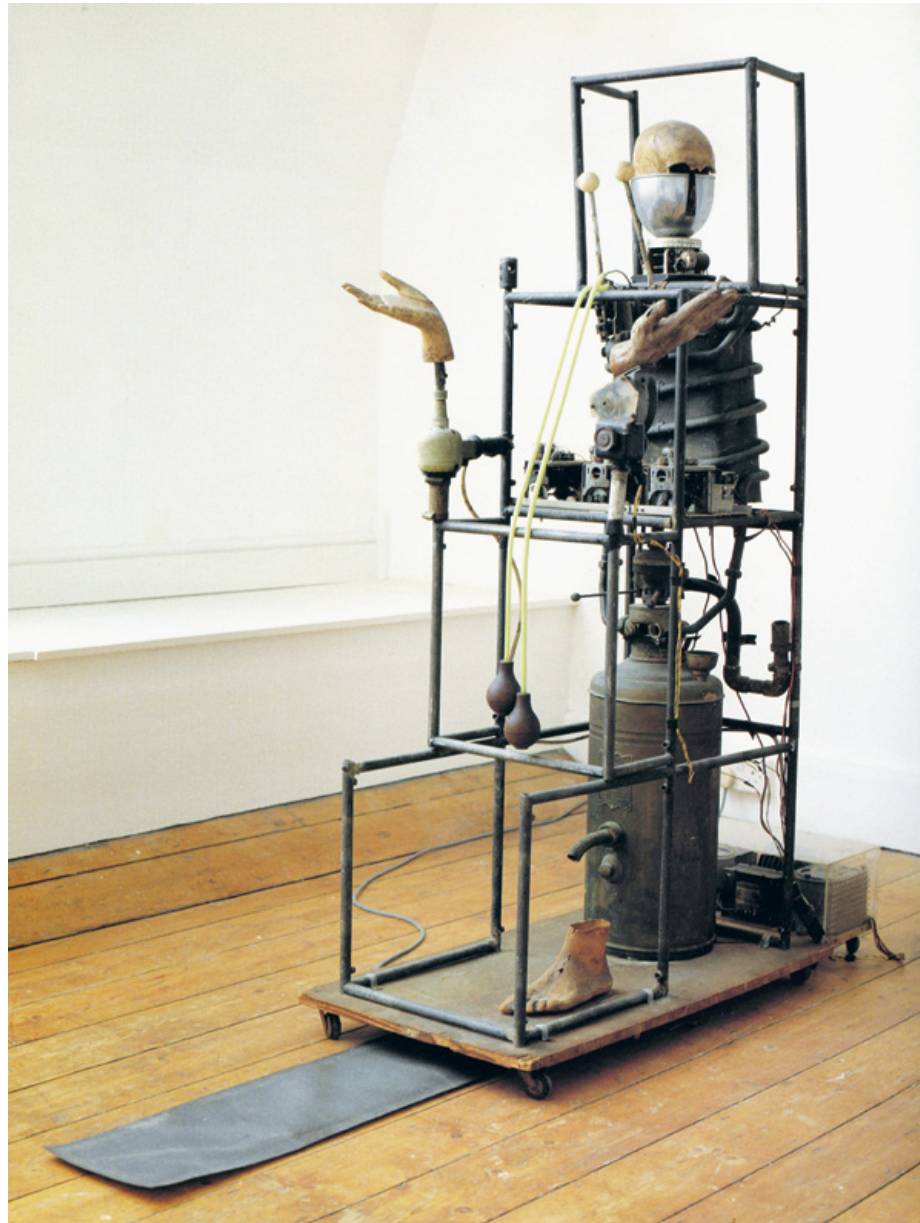
These are delicate fighting machines by Tajiri, made during the 1950s. Adorned with feathers, they are light and decorative. No subsequent fighting machines would be this gentle.



The advent of Survival Research Laboratories, 30 years later, provides a complete contrast.



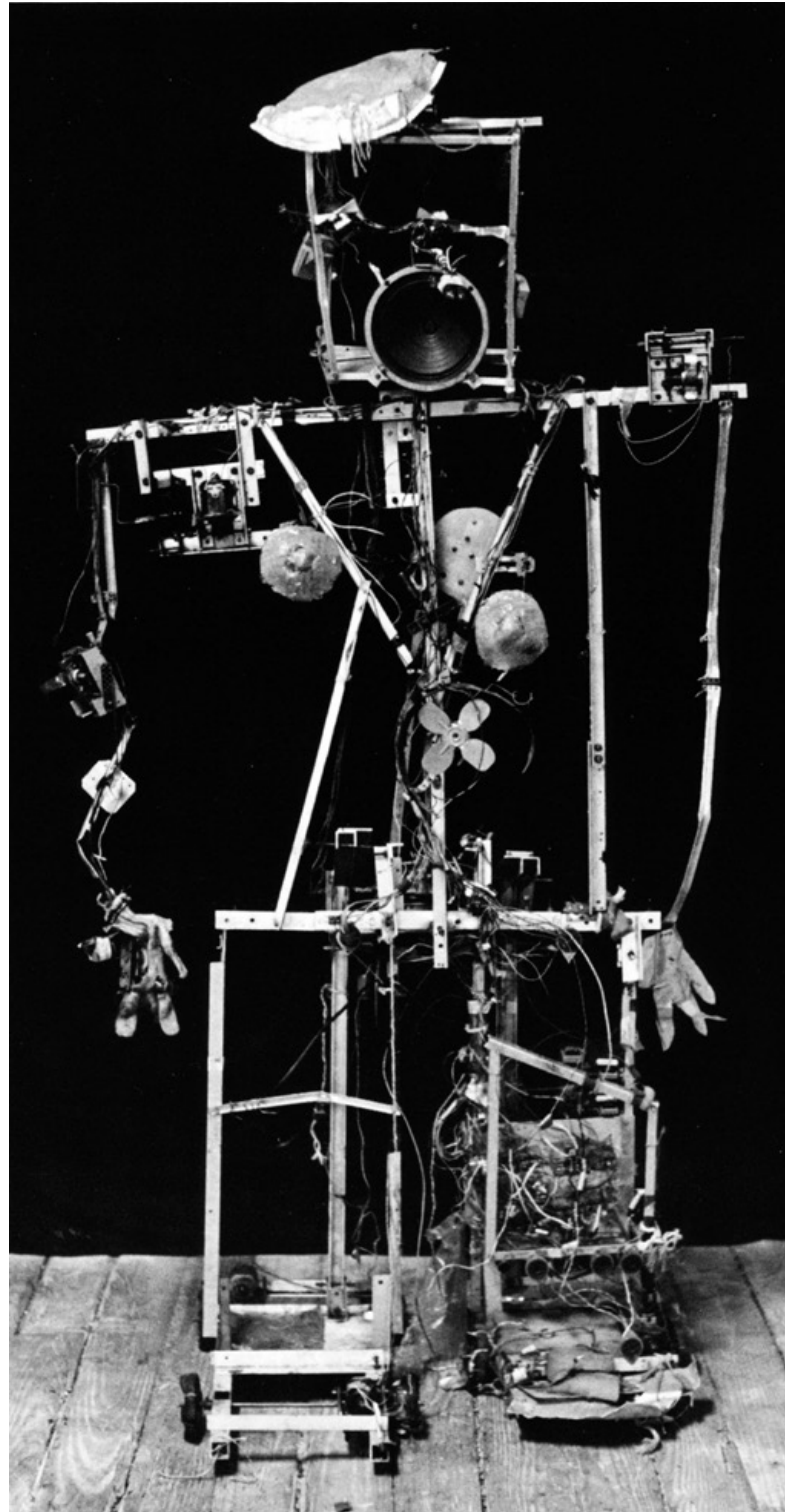
The 1960s saw the arrival of Bruce Lacey's cautionary robots that warned us about technological future. This sculpture is called *Superman 2963* and was made in 1963.

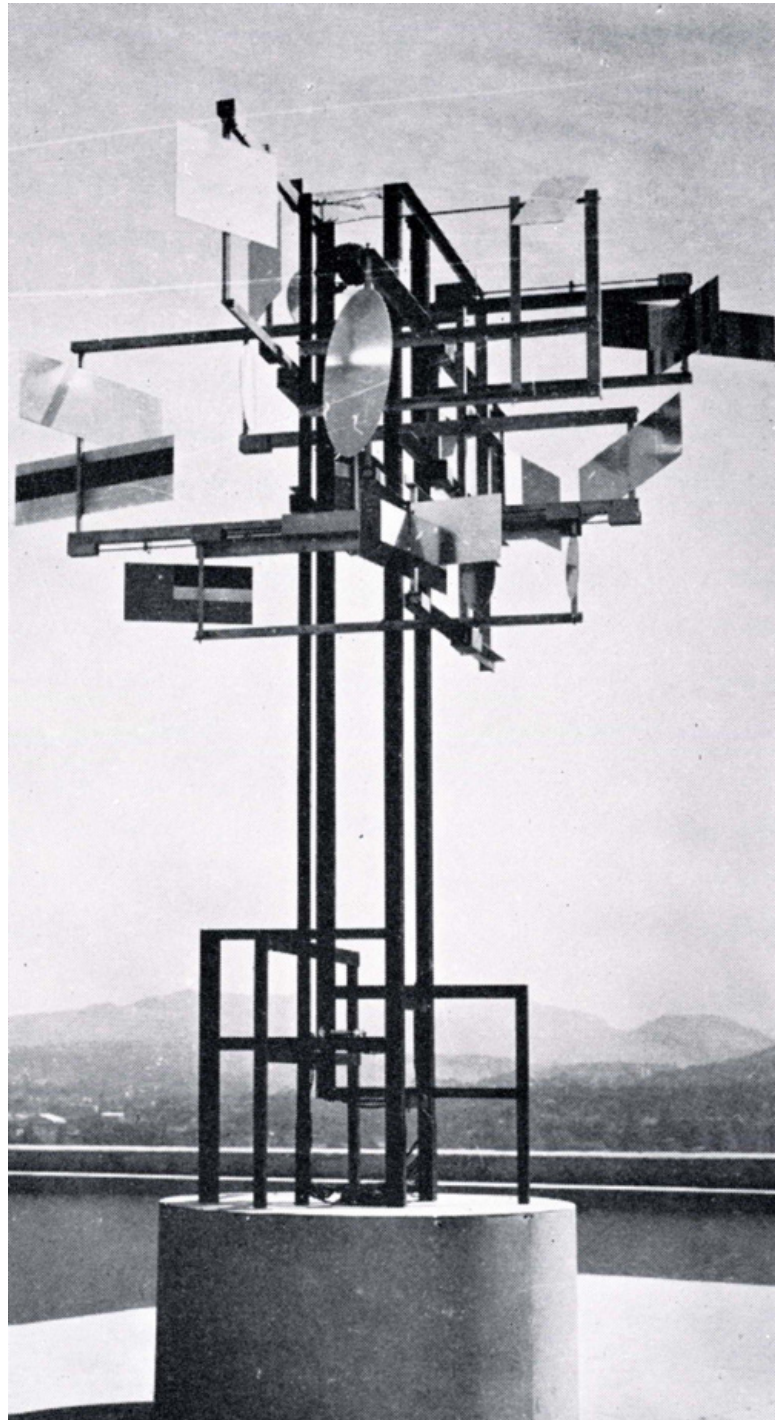


Lacey writes about it:

This is a man who has been dehumanised by the machine and has become in fact a machine himself. Now, he just performs a few simple operations designed to make him feel he is still human.

Nam Jun Paik *Robot K-456*, of 1964. This female robot was shown in *Cybernetic Serendipity*. It walked with difficulty, required a lot of attention and had the habit of peeing without any warning. Many years later, she committed suicide on 6th avenue in New York by allowing herself to be run over.



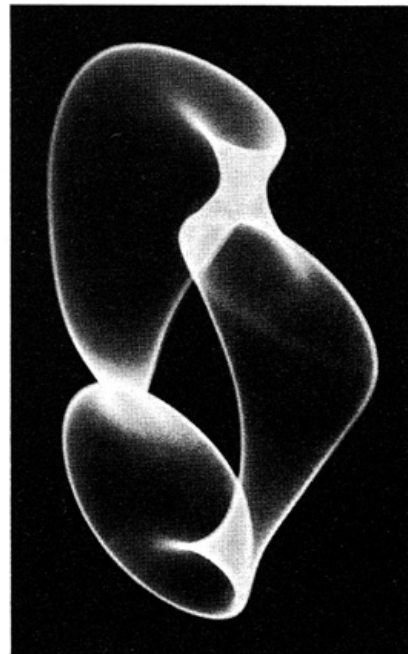
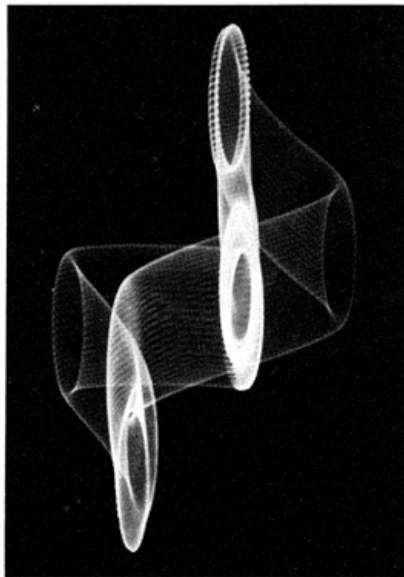
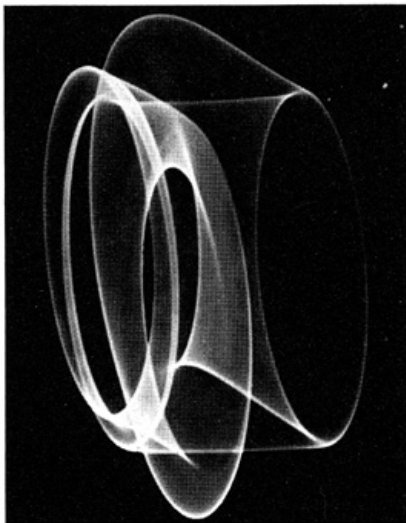
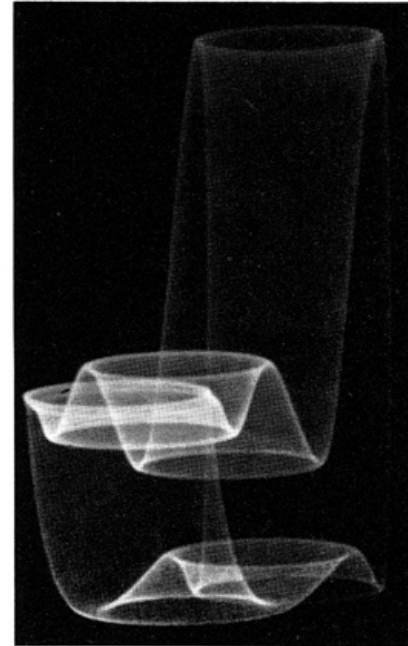
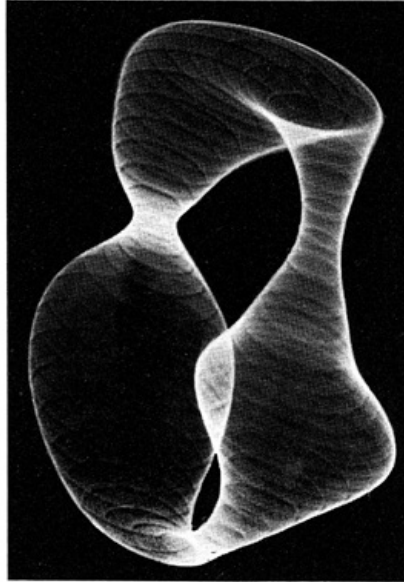
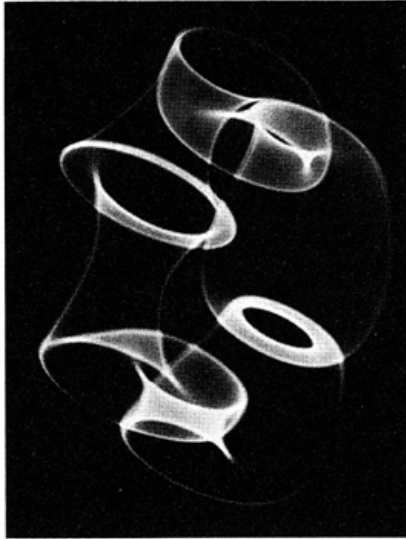


Nicolas Schoffer's 1967 cybernetic sculpture also performed in *Cybernetic Serendipity*. Called CYSP, for cybernetics and spatiodynamics, it moved around on rollers, became excited by silence and the colour blue, and calmed by noise and the colour red. When excited, it moved forward, retreated, made a quick turn and its plates started turning very fast. Since all the machines in *Cybernetic Serendipity*, were responding to each other's movements and sounds, it was enormously difficult to control the exhibits. This sculpture had to have a special attendant. 19

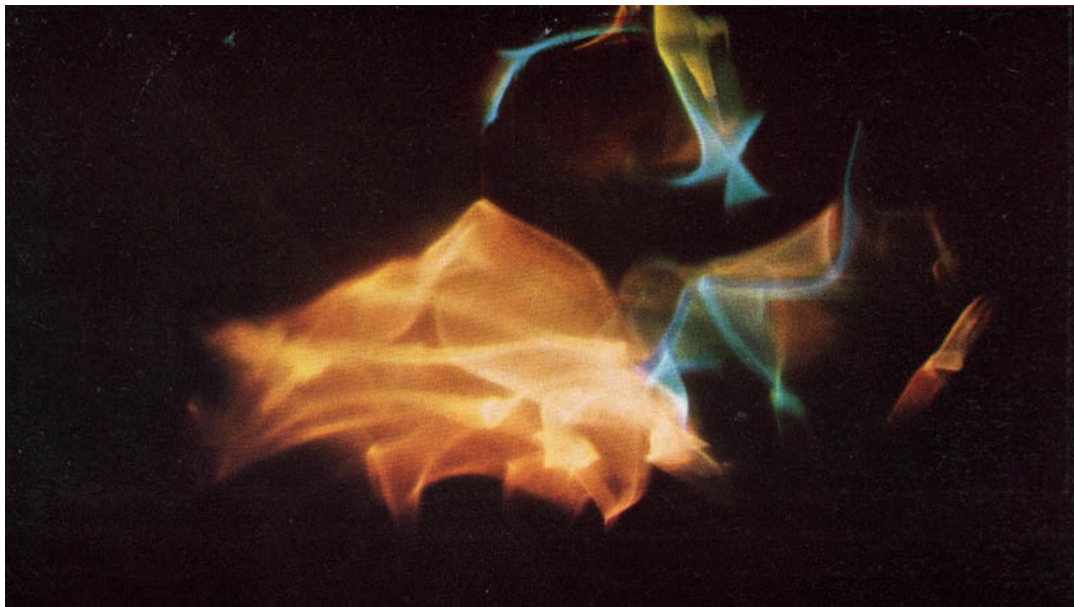
Among the very early kinetic artists, working mainly with light was Gyorgy Kepes, the first director of the Center of Advanced Visual Studies at MIT. This is his elegant *Kinetic Light Lines*, 1953.



Two more people working with light. In 1953, Herbert Franke used an analogue computer and a cathode-ray tube display to create continually modified oscillographs.



Another person working with light and motion was Frank Malina in his Lumidyne constructions. They consisted of moving elements in front of a screen and changing patterns of projected lights. His definition of kinetic art was that it must involve two types of major change with time: changes of shape and line; and changes of colour. This work from 1963 is called *Flowers*.



The works for *Cybernetic Serendipity* came principally from two streams. One stream belonged to the artists who made sculptures that moved, performed, interacted. The other stream consisted of computer graphics and animations which were made by engineers and scientists. (I simplify, of course, because there was also computer composed and generated music, history of cybernetics and various other sculptures and objects that were neither made by artists nor based on the uses of the computer.)

Cybernetic Serendipity was like a railway station, a junction at which people arrived from different directions. They didn't know each other, and they didn't know about each other. There was one element that was relevant to most of the works, and that was chance, or randomness.

By the time work on Cybernetic Serendipity started, the enormous old computers were already on their way out.

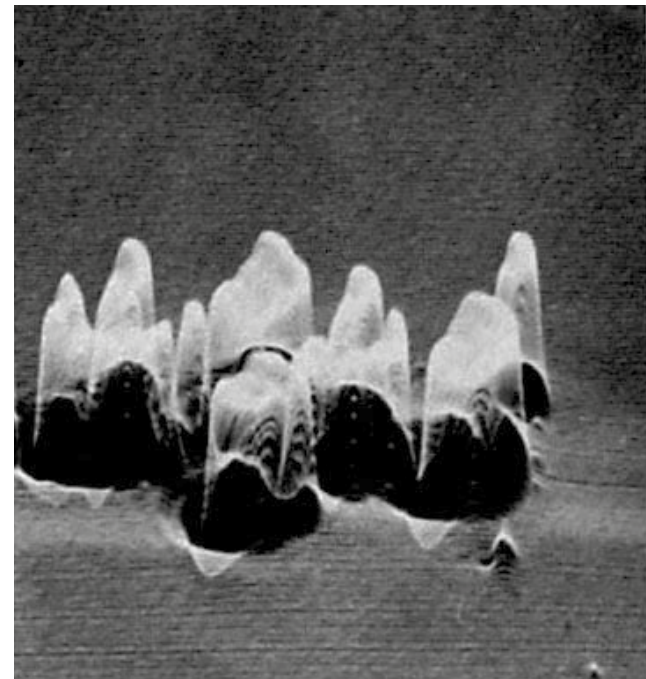
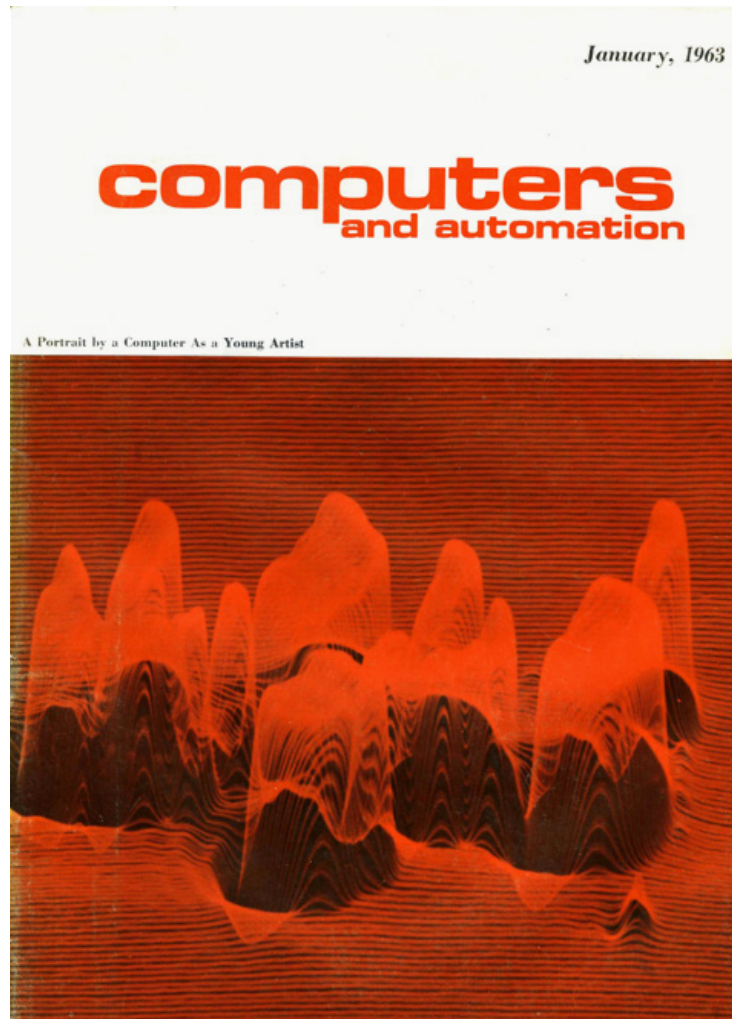




How did it all start? In 1965 Professor Max Bense, who was a philosopher, concrete poet and scientist, came to London from Stuttgart to see an exhibition of concrete poetry I had organised at the Institute of Contemporary Arts. It was called *Between Poetry and Painting*. We met on several occasions, and he asked me at one point, what I was going to do next? As I didn't know, he suggested that I should 'look into computers'. And so I did, and one of the first sources I went to was of course *Computers and Automation* and many of the contributors to *Cybernetic Serendipity* were found in the pages of that journal, including Bela Julesz, Michael Noll, Frieder Nake, and Georg Nees.

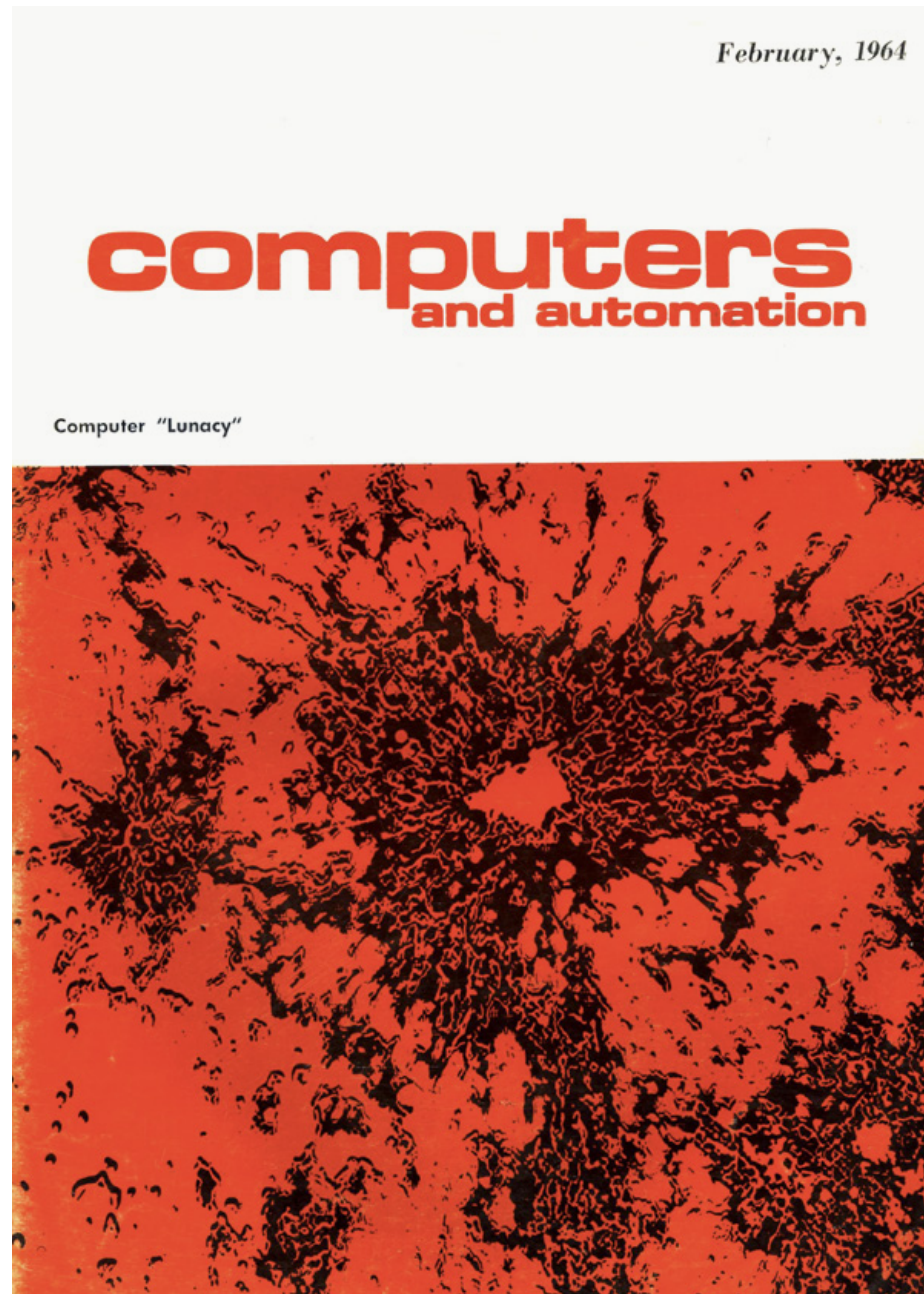
Computers and Automation was founded in 1950 by Edmund C. Berkeley, it was the first computer periodical. In 1963 *Computers and Animation* initiated an annual competition for visually interesting computer graphics. Usually, the competition took place in August but this was the cover of the January issue of 1963.

This image was produced at MIT by feeding images from a TV camera to computer and controlling the representation of the data on an oscilloscope.



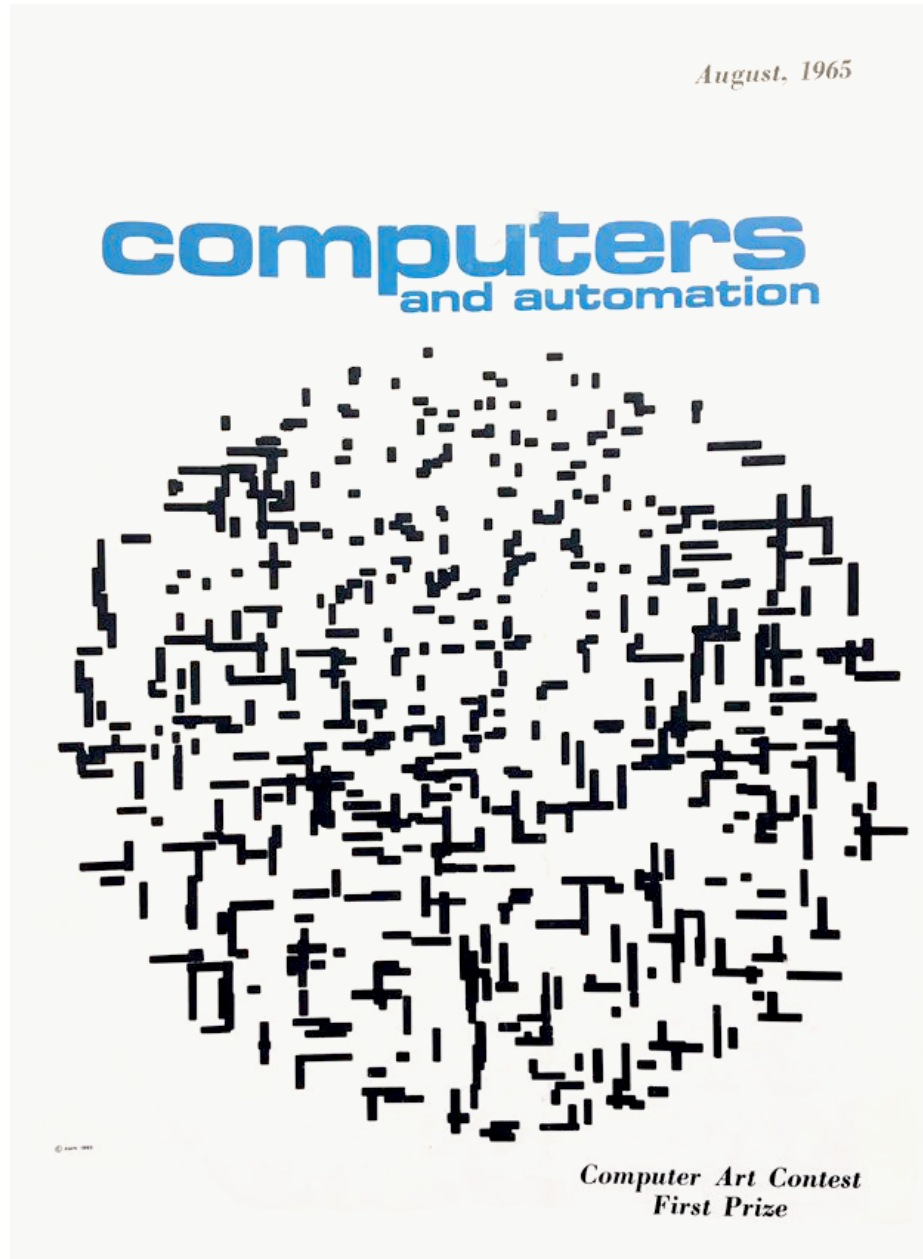
But by August the same year there was the first winner of the annual competition. It was Frieder Nake with a star pattern of which, alas, I don't have a picture.

One of the most spectacular contributions appeared on the cover of the February issue in 1964. It was the splatter diagram from the US Army Ballistic Research Laboratories in Maryland.

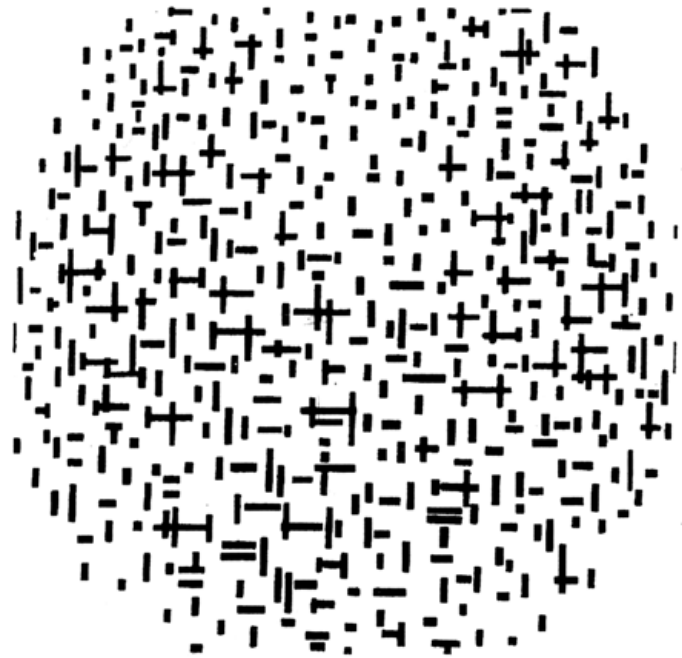


And now I will show you very quickly some of the covers and pages from *Computers and Automation*, and you will see many of the images that are now so familiar. Most of them came from Germany and America.

In 1965, the winner was Michael A. Noll with his Mondrian pattern.



He argued that his image was more popular than the original Plus and Minus picture of 1917 by Mondrian on which it was based. The original Mondrian is on the right.



A couple of pages from the 1965 issue with two images by Michael Noll on the right.



THE ANNUAL COMPUTER ART CONTEST OF "COMPUTERS AND AUTOMATION"

The front cover of our August issue is awarded to an entry by A. Michael Noll, Research Engineer, of Newark, N. J., entitled "Computer Composition with Lines". He says:

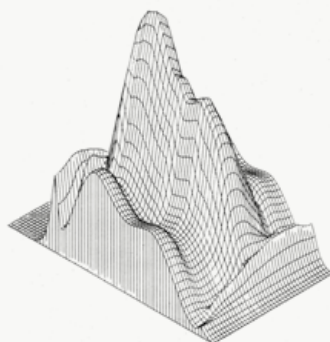
The positions of the vertical and horizontal bars have been chosen at random with the constraint that the positions must fall inside a circle. The length and width of the bars was chosen at random within a specified range. If the position of the bar fell within a parabolic region in the upper half of the circle, the length of the bar was shortened by a factor proportional to the distance of the position from the edge of the parabolic region. The motivation for this type of pattern came from Piet Mondrian's "Composition with Lines", 1917, now in the possession of the Rijksmuseum Kröller-Müller, Otterlo, The Netherlands.

Four other computer art drawings are also included in our August issue with honorable mention. Each is explained with some notes next to the picture of the drawing.

Next year we expect to run this contest again, and we invite contributions of computer art from interested readers.

NEUTRON FLUX DISTRIBUTION

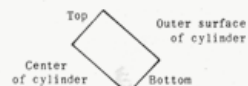
by D. J. DiLeonardo, Westinghouse
Electric Corp., Bettis Atomic Power
Laboratory, West Mifflin, Pa. 15122



When studying the physics behavior of a nuclear reactor, the neutron diffusion equation in two dimensions is solved by finite difference techniques to determine the neutron flux (the product of the neutron density and velocity) and power density at various locations in the reactor core. Typical problems may consist of a mesh containing 5000 points.

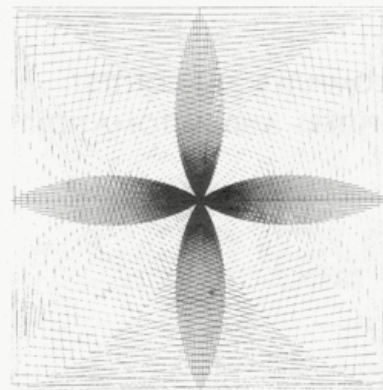
To help interpret and digest the mass of data generated by the physics calculations, a FORTRAN program has been written to draw isometric plots of the data using a Calcomp Plotter.

Here is a plot obtained from a sample two-dimensional diffusion equation calculation. It shows the distribution of the neutron flux below 1 electron-volt in a vertical r - z slice through a fuel module assembly of cylindrical geometry. The orientation of the plot is shown in the figure below:



In addition to its quantitative value the plot seems to possess a certain artistic value.

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VERTICAL-HORIZONTAL NO. 3

by A. Michael Noll

101 randomly selected points (with x -coordinate less than the y -coordinate) were connected by vertical and horizontal line segments to form a single line. The lines were determined under the condition that only one of the two coordinates was changed (alternatingly) from one point to the next.



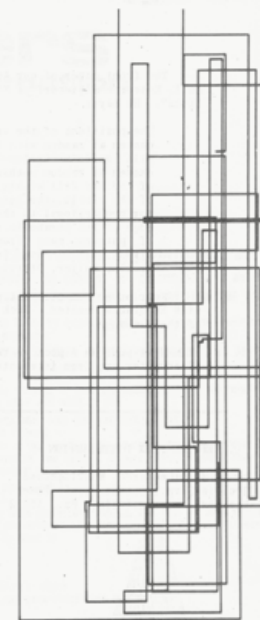
© 1965

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TESTING PATTERN

by California Computer Products, Inc.
Anaheim, Calif.

This is one of the patterns used for testing the operation of the Calcomp Plotter.



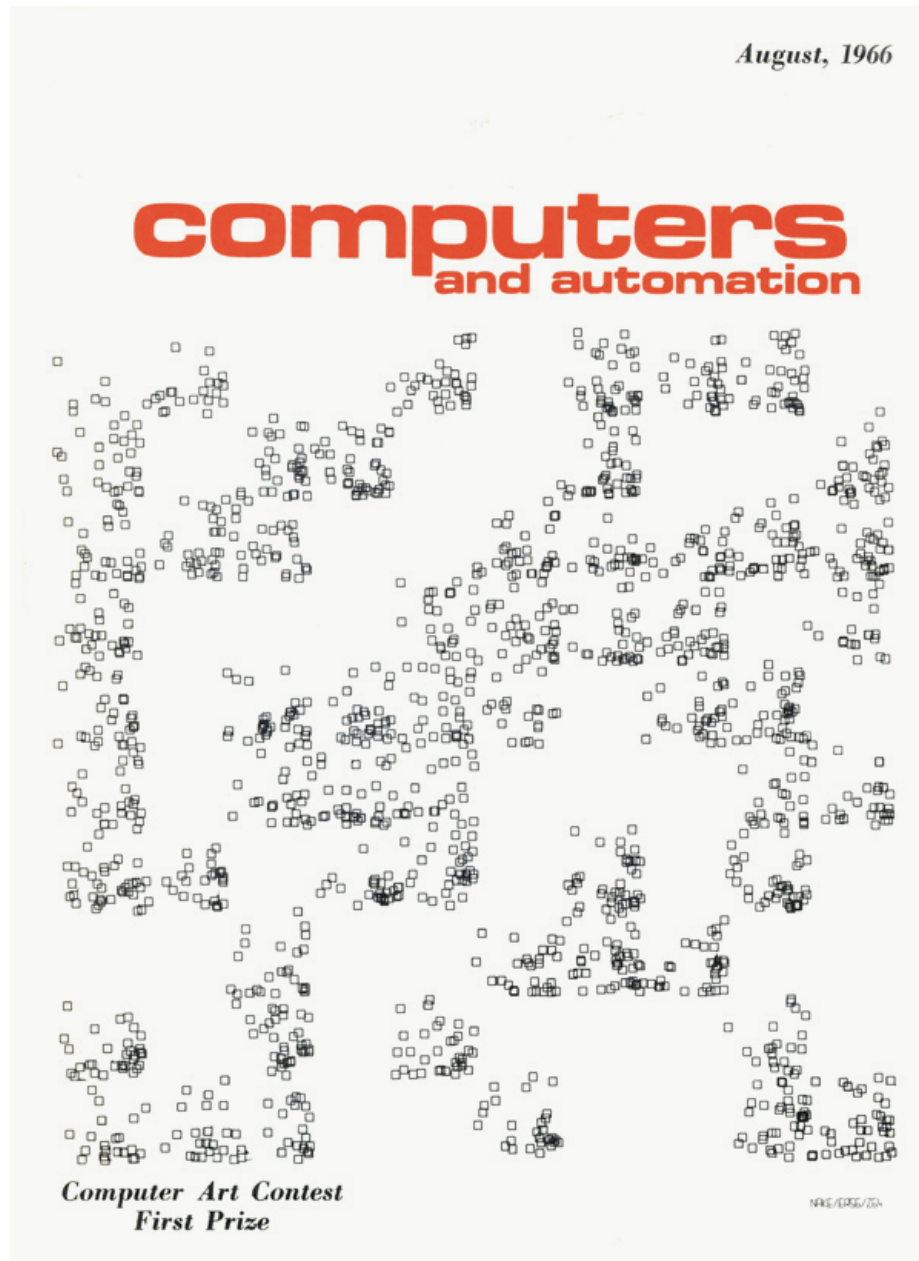
© 1965

GAUSSIAN QUADRATIC

by A. Michael Noll

The horizontal positions of the end points of the line segments have a Gaussian or normal curve distribution; the vertical positions increase quadratically, until they reach the top, except that when any vertical position measured is greater than the constant height, then the constant height is subtracted. The result is a line that starts at the bottom of the drawing and randomly zigzags to the top in continually increasing steps; at the top, the line is translated to the bottom to once again continue its rise.

Frieder Nake won the contest for the second time in 1966 with this pattern of uniform small squares.



Inside there were other computer aided images, another Frieder Nake and moiré patterns by Maughan S. Mason

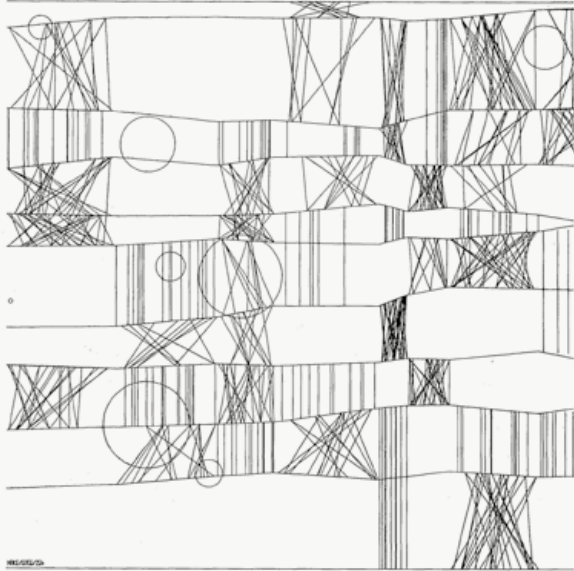


THE ANNUAL COMPUTER ART CONTEST OF "COMPUTERS AND AUTOMATION"

The first prize of our 1966 Computer Art Contest is awarded to Frieder Nake, Stuttgart, Germany. This drawing is the result of producing uniform small squares with a kind of regular irregularity specifically suitable to a computer's patience. It appears on the front cover of this issue, and in miniature above.

All the other computer art drawings published in this issue receive honorable mentions. For some of these drawings, the explanation is obvious or can easily be inferred; for others, some explanation is given.

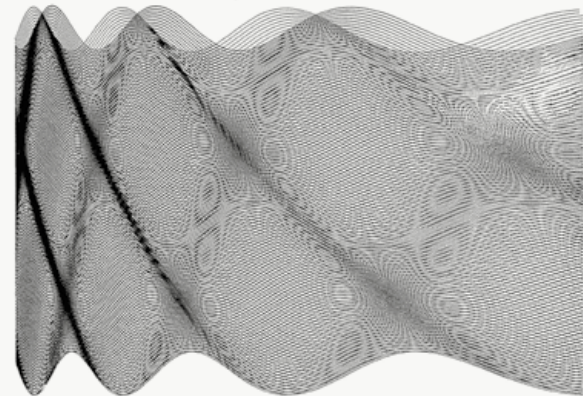
Next year we expect to run this contest again, and we again invite contributions of computer art from our readers.



Another drawing entered by Frieder Nake.

R

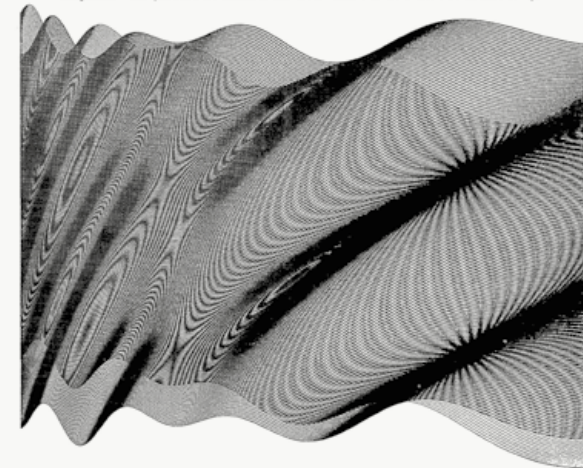
COMPUTERS and AUTOMATION for August, 1966



SILK PATTERNS

From Maughan S. Mason, Huntsville, Alabama 35002

Both these drawings were generated by an analog computer with an X-Y plotter output. The originals were plotted in black India ink, with one dimension 30 inches long.

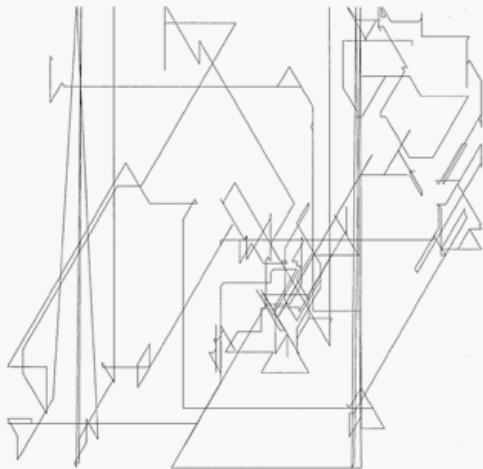


COMPUTERS and AUTOMATION for August, 1966

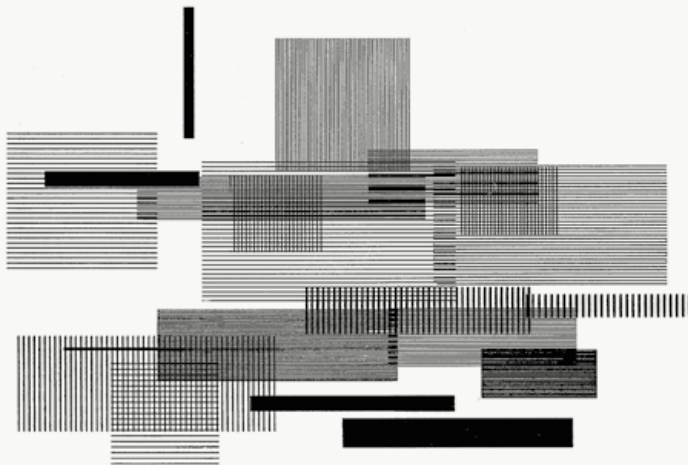
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Here is another spread from the same issue.

On the right Petar Milojevic and D.K. Robbins, and on the left 2 more images by Nake.

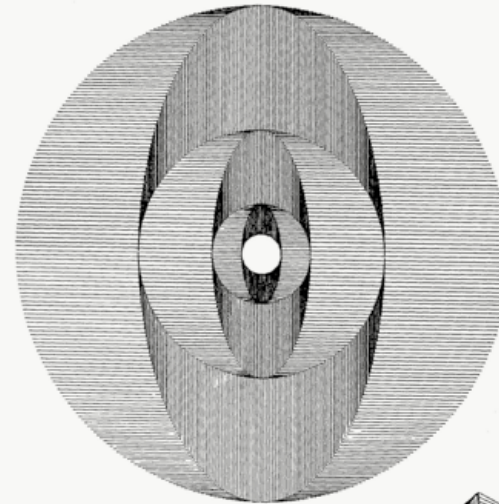


Here are two more examples
of the computer art work
of Frieder Nake of Stuttgart,
Germany.



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COMPUTERS and AUTOMATION for August, 1966



ELLIPSES AND
CIRCLES

Peter Milojevic
McGill University
Montreal, Quebec,
Canada

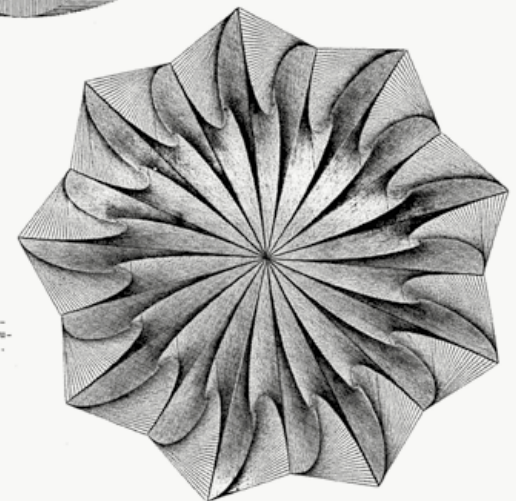
A composition based
on circles and ellipses

ROSETTE

D. K. Robbins
Sandia Corp.
Albuquerque, N. M.

The figure at the right repre-
sents a modification of a solu-
tion to a problem in calculus.

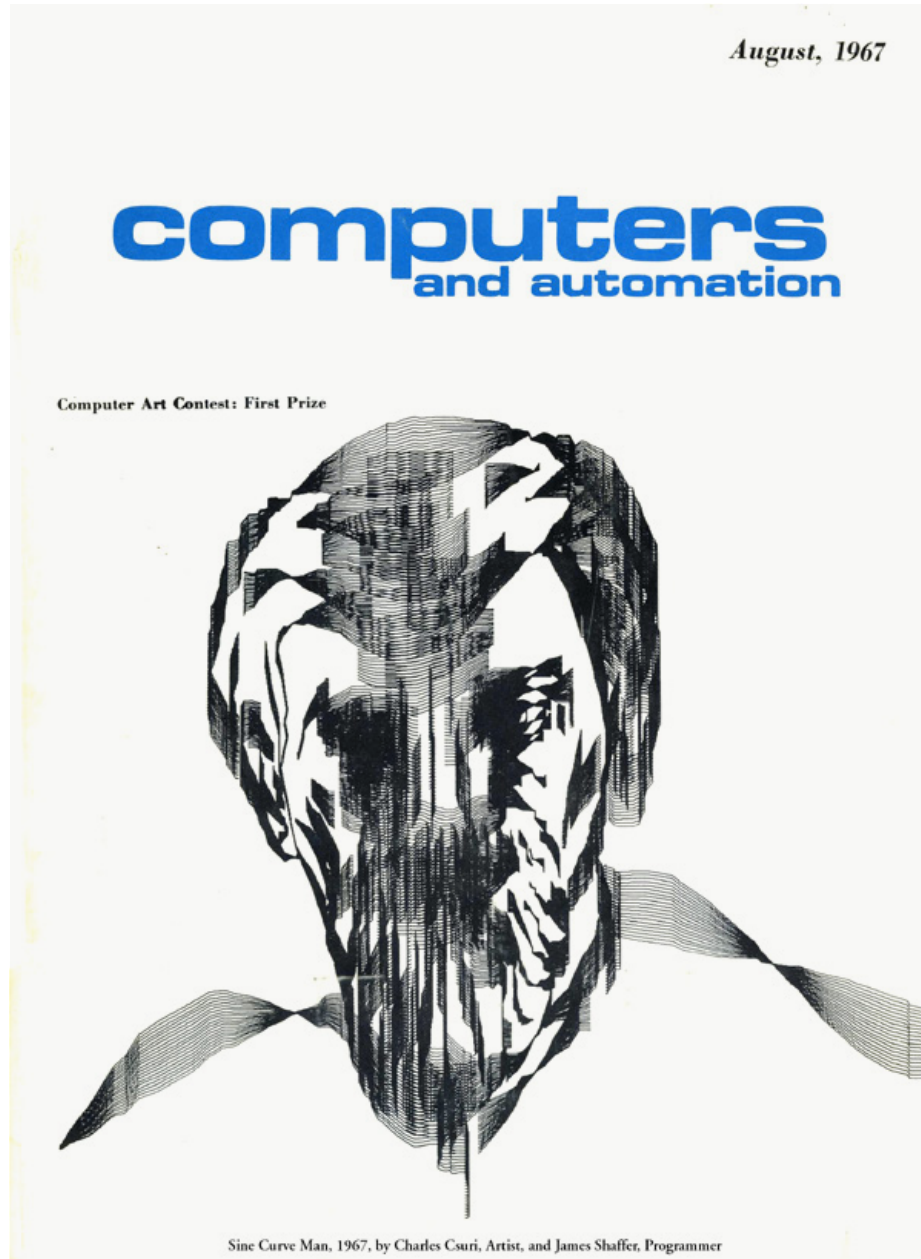
It was drawn on a CalComp
plotter made by California
Computer Products.



COMPUTERS and AUTOMATION for August, 1966

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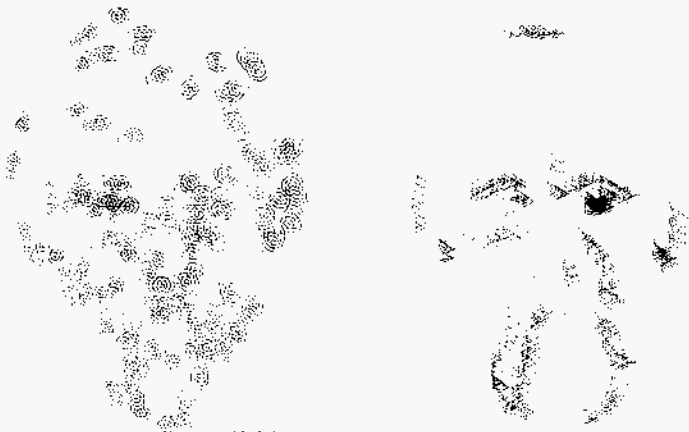
In 1967, the winners of the competition were Charles Csuri and James Shaffer with this *Sine Curve Man*.



and here is a better picture..



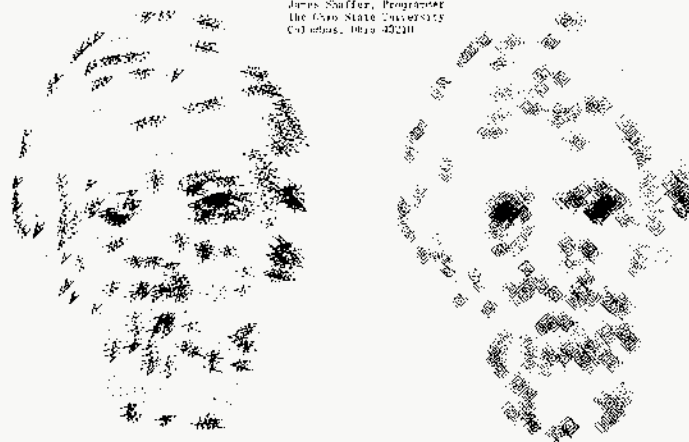
On the inside pages more experiments with faces by Csuri.



FACES IN RANDOM LIGHT AND SHADOW

A line drawing was transformed mathematically into a shaded image. Then a spiral, rectangle, triangle, and star were used as character symbols through each line segment. A random number generator determined the accessibility size of each symbol as a function of its distance from a reference point outside the picture.

Charles Csuri, Professor, School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210



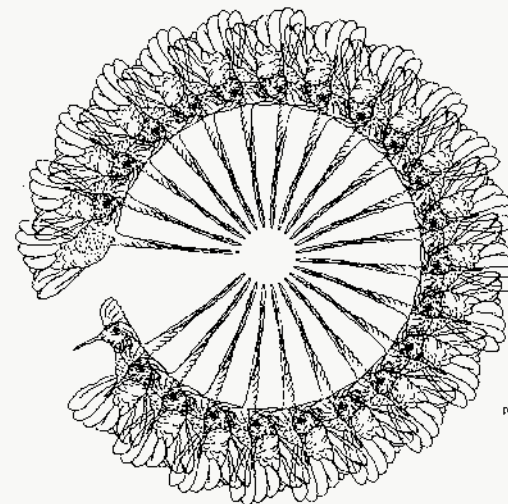
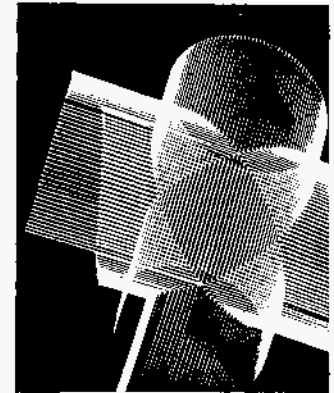
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COMPUTERS and AUTOMATION for August, 1967

CYLINDERS

Picture of an image being displayed on a cathode ray tube. In the 7000 200 computer memory is a description in three dimensional coordinates of the image. The image is similar to two intersecting cylinders. The image is drawn line-by-line at an overall frame rate of 40 frames per second.

- Adage Inc.
Boston, Mass. 02215



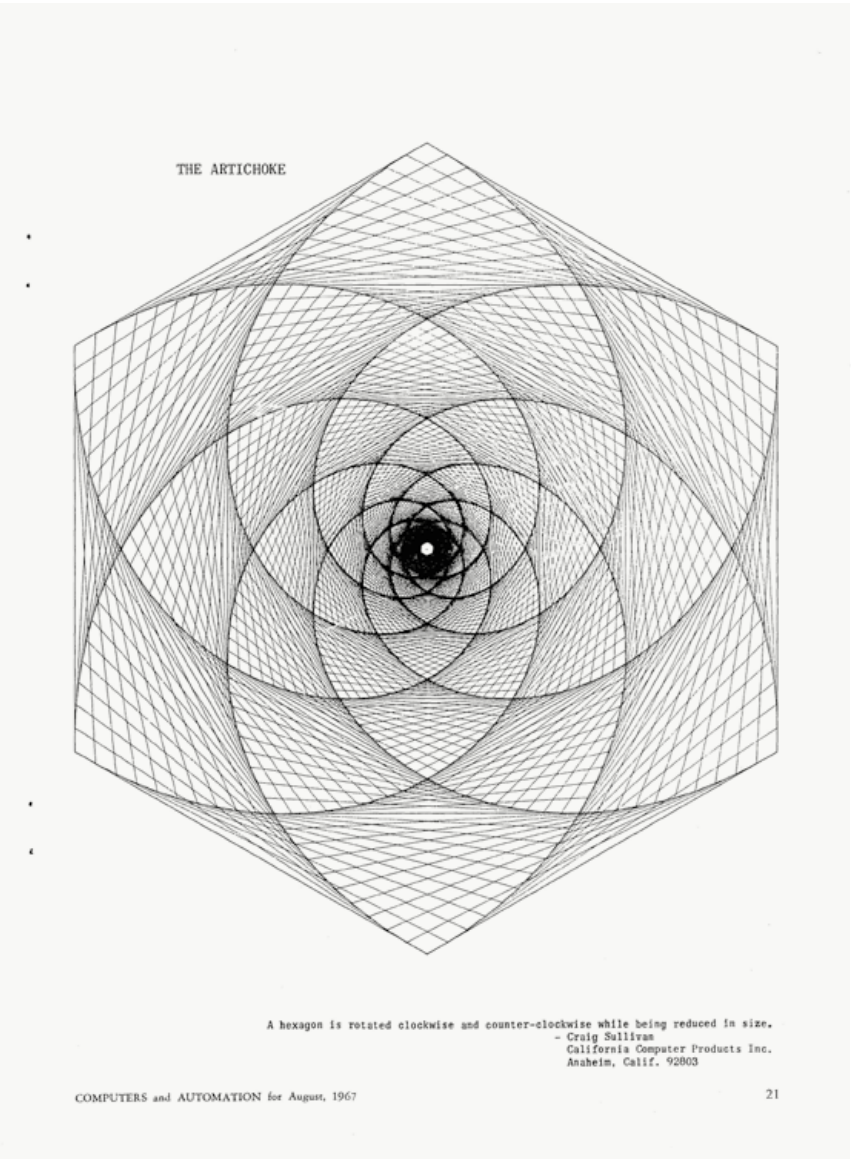
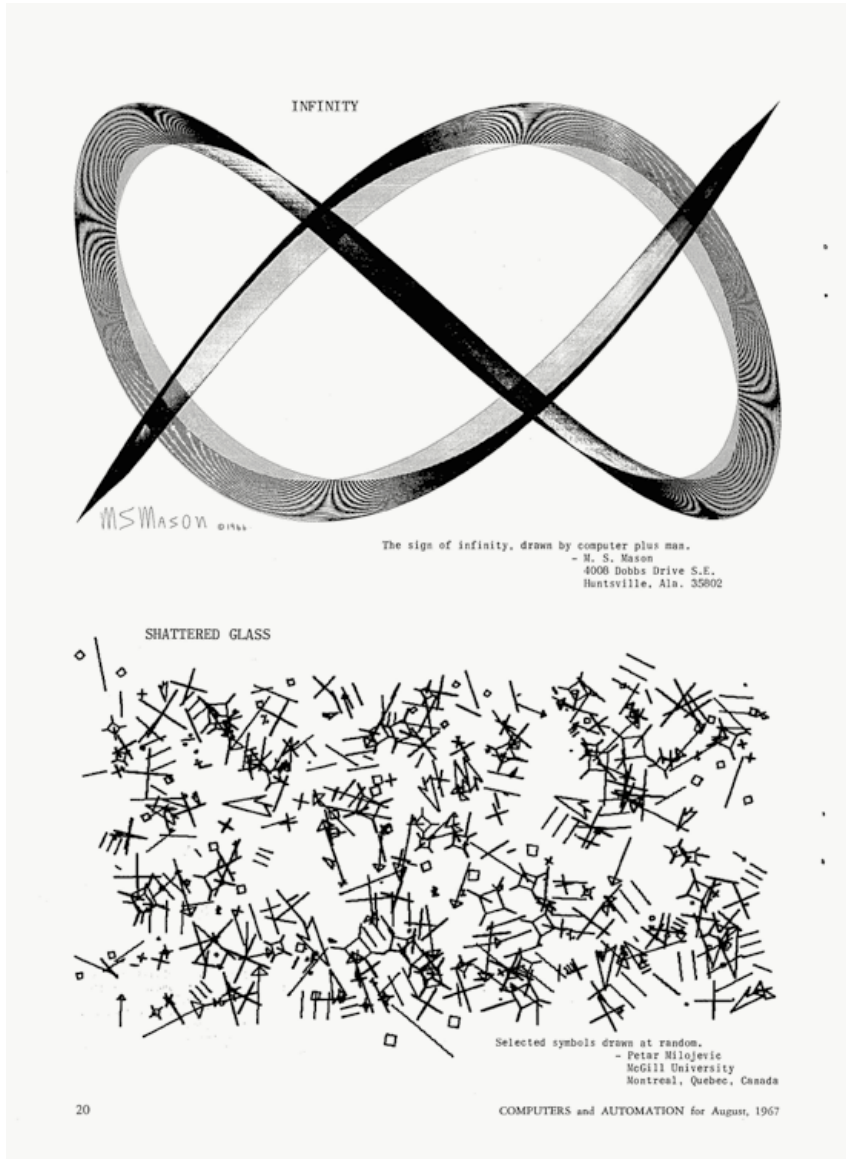
BIRD IN A CIRCLE

The drawing of a hummingbird was placed on a polar coordinate system. The program calls for 22 birds to be placed in a circle.
Charles Csuri, Professor
School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

COMPUTERS and AUTOMATION for August, 1967

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Here is another double-page spread from the 1967 August issue.



Here is the cover of the 1968 issue. The winners are Gary Craigmile and Kerry Strand with this *Humming Bird*.

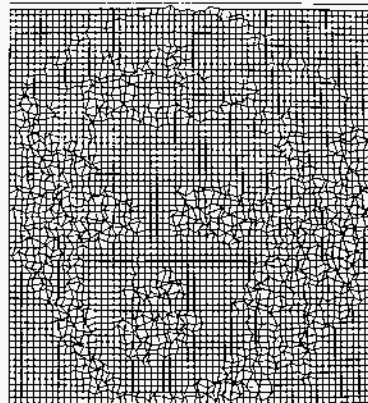


This issue was bigger, probably because *Cybernetic Serendipity* exhibition opened at the same time and many more works became available. Some of these images appeared in the magazine before. But here for the first time you see the work of the Computer Technique Group of Tokyo: Kennedy, Marilyn and *Return to the Square* top right.

STAR KENNEDY

— Designed by Masao Nomura
Programmed by Haruhiko Tsuchiya

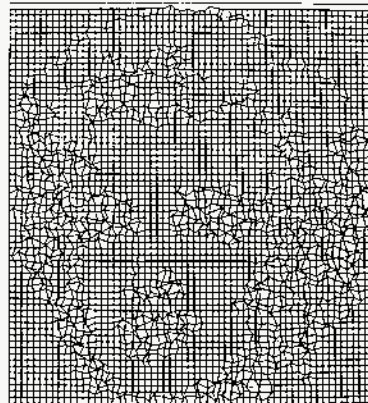
A pattern deformation system was applied to a photograph of John F. Kennedy. Sizes of random size were put on the point of data from the photo. An IBM 7090 computer and CalComp 565 plotter were used.



MONROE IN THE NET

— Haruka Tsuchiya

A pattern deformation system was applied to a photograph of James Monroe. The canvas was first set as a net ready for deformation. The data from the photo actuated each element of the net by random number. An IBM 7090 computer and CalComp 565 plotter were used.



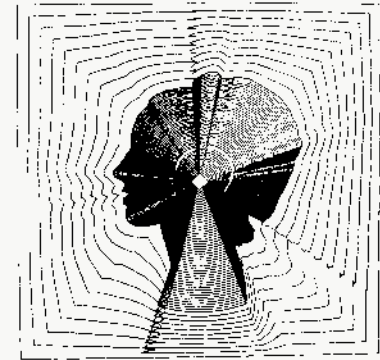
16

COMPUTERS and AUTOMATION for August, 1966

RETURN TO SQUARE

— Designed by Masao Nomura
Programmed by Kazuo Yamamoto

This is a computer metamorphosis. A square is metamorphosed into a profile of a woman, and then returned to a square again. The profile is input data. The process of metamorphosis is visualized as a movement and metamorphosis itself is presented as an object. An IBM 7090 computer and CalComp 565 plotter were used.



ABRAHAM LINCOLN

— Michael H. Craven

This picture was first digitized by hand, then programmed in 1080 APT statements. The subroutine calculated the tool motion to black in any rectangle when the four sides were defined. A second subroutine assisted in calculating the tool position for the shadowing made up of 400 lines, 62" apart. The picture was drawn directly onto rigid film using a beam of light of varying size.

COMPUTERS and AUTOMATION for August, 1969

17

And, also in this issue, as you can see, there was colour. So that was August 1968, and that was when *Cybernetic Serendipity* opened.

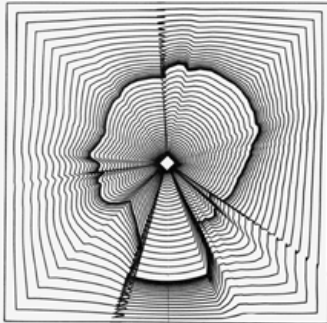


Now I want to tell you a bit about *Cybernetic Serendipity*. Here is the first announcement of the exhibition.

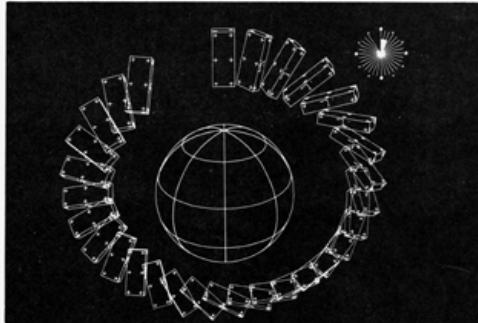
'CYBERNETIC SERENDIPITY' opens on August 2nd 1968 until October 20th 1968 at the ICA Gallery, Nash House, The Mall, London, SW1.

Tuesdays, Thursdays,
Saturdays : 11 - 6 pm
Wednesdays, Fridays: 11 - 9 pm
Sundays: 2 - 6 pm
Mondays: closed

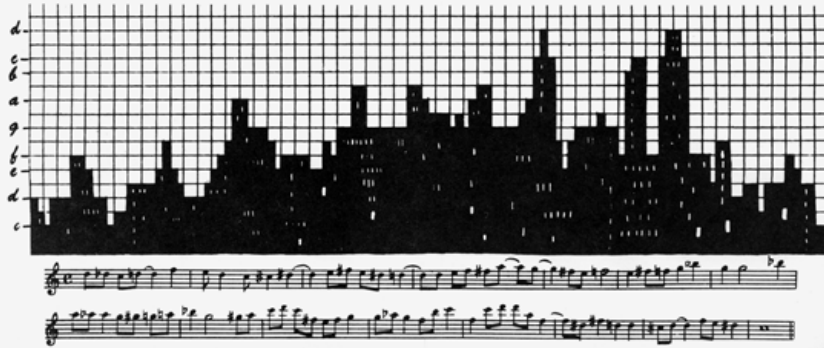
Admission to exhibition and demonstrations: 8/-
For ICA standard members: 4/-
For ICA full members: free
Daily film shows: 2/6



Computer graphic by Hasao Komura and Kunio Yamanaka of Computer Technique Group from Tokyo



Still from a computer animated film 'Simulation of a Two-Gyro, Gravity-Gradient Attitude Control System' by E.E. Zajac, of Bell Telephone Laboratories, New Jersey

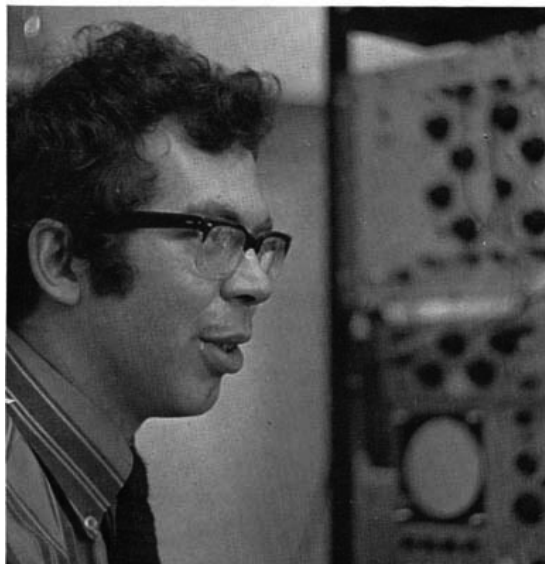


Detail of a poster for The Schillinger System of Musical Composition, 1946. 'New York Skyline' was composed as a piano piece by Villa Lobos

Preparation took three years, starting in 1965. When the project was first started the ICA had a gallery on the first floor of number 17 Dover Street in central London. There were very tiny offices in the same street, and at the time, the ICA employed only 5 people.

By the time the exhibition opened in August 1968, there were new premises in The Mall and a huge gallery.

There were four people principally involved with the exhibition, but in the end about 50 people worked on it. Top left is JR; top right Peter Schmidt, music consultant; bottom left, Mark Dowson, technical consultant; bottom right: Franciszka Themerson, designer of the exhibition and of all the printed material.



This is her poster using images from the works that were exhibited. The text was typed on a typewriter. On the right is the list of 16 lectures. None of them were recorded. ICA had no recording equipment. Among the speakers, were: Iannis Xenakis, Abraham Moles, Gordon Pask, Frank Malina.

The text on the left of the poster elucidates the title, *Cybernetic Serendipity*, as the faculty of making happy chance discoveries by means of control and communication machines both human and electronic.

An exhibition

happy chance discoveries by means of control and communication machines both human and electronic

the faculty of making

computer-generated graphics
computer-generated film
computer-generated music
computer games
cybernetic devices
remote control systems
cybernetic sculptures

and other serendipitous manifestations

Institute of Contemporary Arts
August 2 - October 20

11 - 4
12 - 9
2 - 6
closed

admission to exhibition and demonstrations 6/-
ICA members 4/-
daily film prices 3/6

Frank D. Malina
Member of the fields of automation,
graphics, cybernetic scientific re-organization
and the visual arts
REFLECTIONS ON THE DIFFERENCE BETWEEN SCIENCE AND ART

Professor Herbert Brun
Governor and Musicologist at School of Music
of the University of Illinois
COMPOSITION'S DRAFT GETS MUSIC

Edward Elin
Director of the Computer Music Network in New York
MUSICAL WITHOUT LABELS

R.S. Thomas
Professor at Generation School
has written numerous literary profiles
and was BARTON BARNWELLLEY

Dr. Christopher Evans
Principal Research Fellow
at the National Physical Laboratory
at the National Physical Laboratory
SILENT AND SILENTLY

Ray Bala
Writer, Journalist, broadcaster and consultant,
is leading a study of the impact of the computer
on society
TODAY IS ALREADY HERE

Professor R.B. Taylor
of the Department of Mechanical Engineering
Queen Mary College, London
WORDS IN THE SERVICE OF MAN

Dr. Gordon Pask
Experimental psychologist and cybernetician
Director of Research at System Research Limited,
CAMBRIDGE ON THE WAY AND INVENTION

Janice Henrich
Composer, Grand prize winner of the IFIP Congress
UNIVERSITY OF CALIFORNIA
UNIVERSITY OF CALIFORNIA IN MUSIC AND ITS FORMALIZATION

Mr. A.S. Morton
Pioneer in the use of computers
in the treatment of music and music literature in general
THE COMPUTER AS AN AID TO LITERARY STUDIES

Mauro Piccini
Composer and Founder of the
Studio of Musical Philosophy in Florence
THE COMPUTER IN MUSIC

Professor Gordon Pask
of Brunel University, biologist and cybernetician
concerned with the application of cybernetics
and information theory to medicine and music
THE SOCIAL IMPLICATIONS OF ART AND CYBERNETICS

Professor J.L. Hutchings
of the Institute of Computer Science at London
THE CONTRIBUTION OF COMPUTERS TO THE ART OF EDUCATION

Professor John Doherty
of the Department of Psychology, Brunel University
VALUES OF INFORMATION

Professor Lionel Penrose
Director Professor of Brain Genetics
at London University
AUTOMATIC MECHANICAL SELF-IDENTIFICATION

Alan Turing
computer system designer and Principal Investigator
at the Cambridge Language Research Unit
TALKING TO COMPUTERS

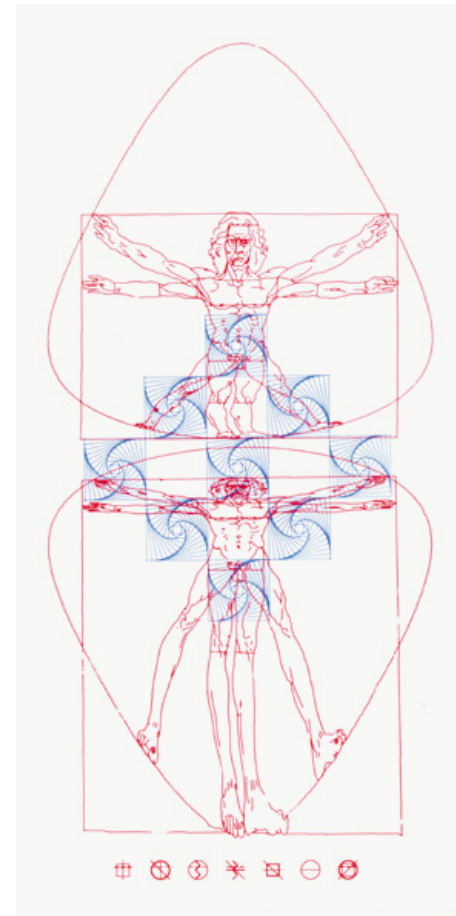
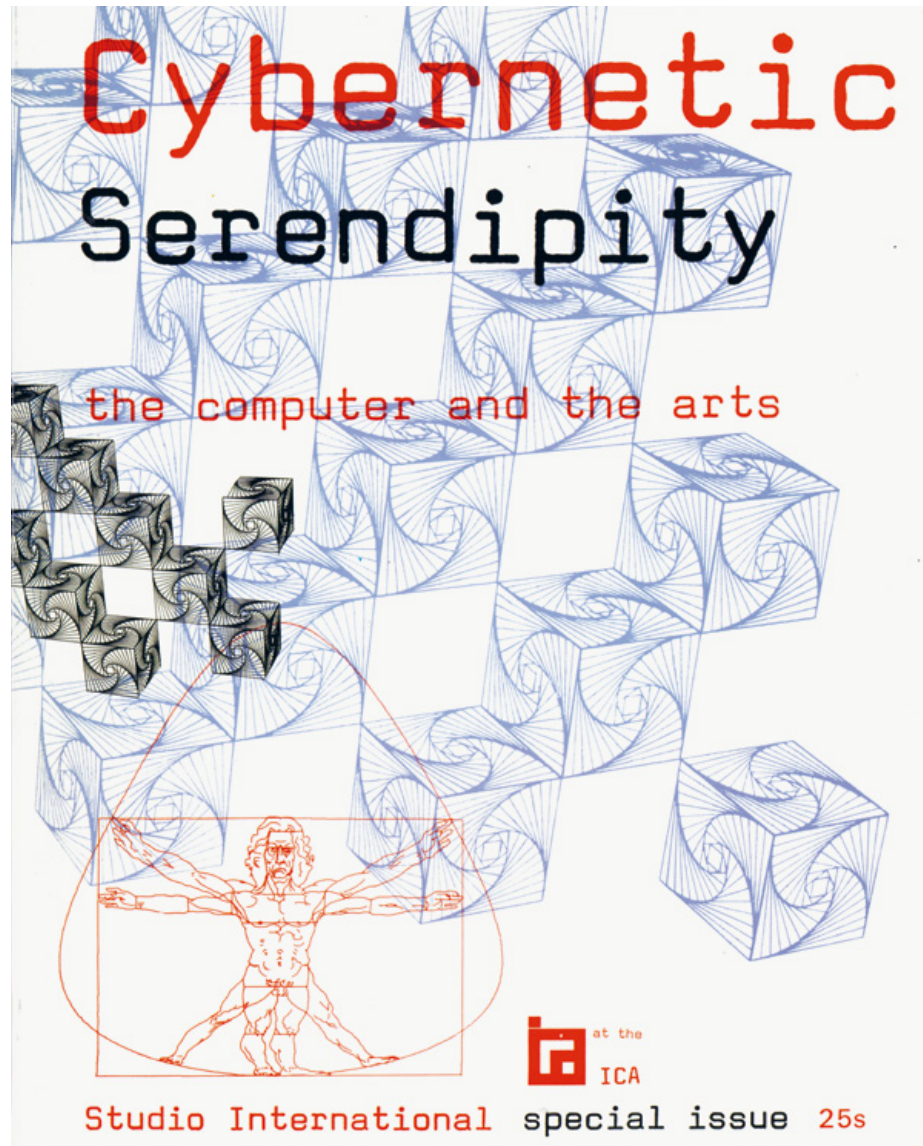
Thursday August 8
Tuesday August 13
Thursday August 15
Tuesday August 20
Tuesday August 27
Tuesday September 3
Thursday September 5
Tuesday September 10
Thursday September 12
Thursday September 19
Tuesday September 24
Thursday September 26
Tuesday October 1
Tuesday October 8
Thursday October 10
Thursday October 17

August 2 - October 20, 1968
During the course
of the Cybernetic Serendipity exhibition
on Tuesdays and Thursdays at 8.00
at South House, The Mall, London S.W.1
a series of lectures will be held
admission - 5/-
ICA members - 3/6
or by exhibition season ticket - 45

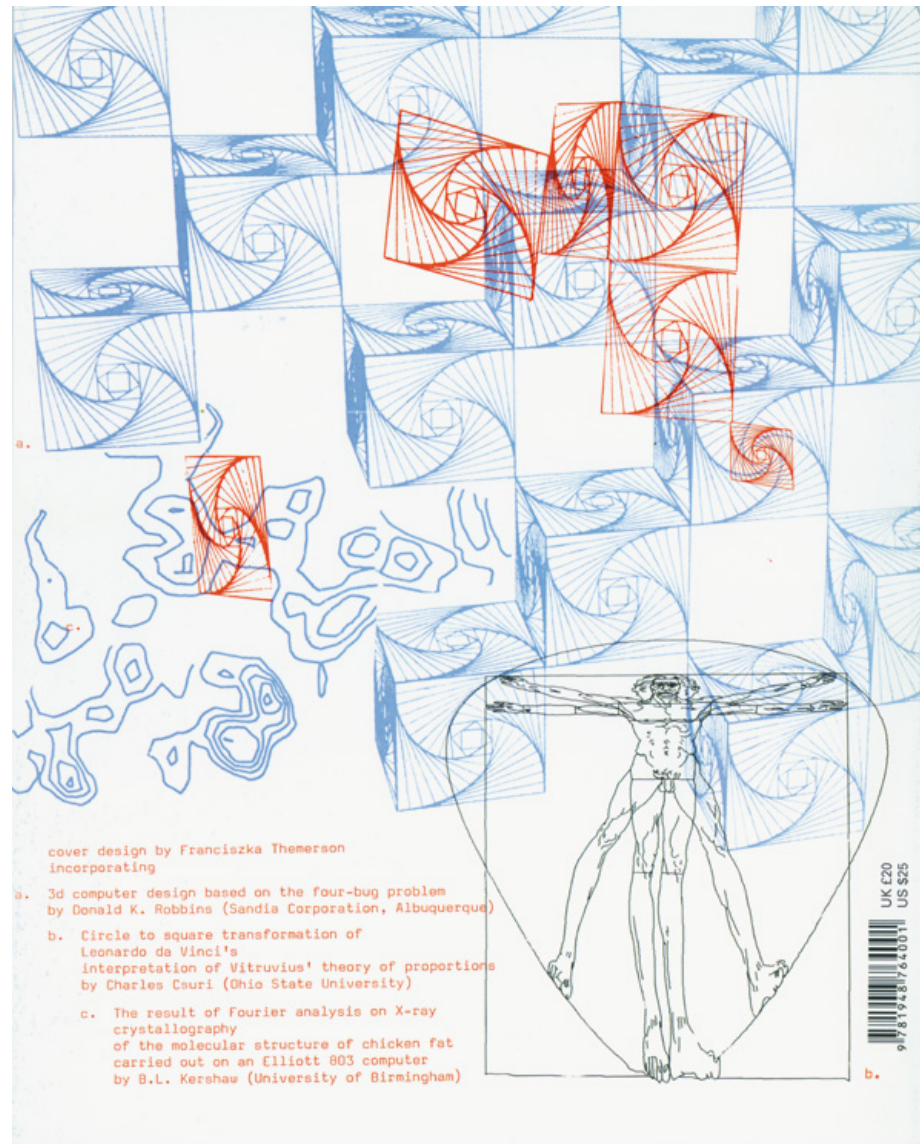
Thomas

The poster is a typewritten document with a central illustration of a blue wireframe robot with a large eye. To the right of the robot is a complex network of red and blue lines. The text is arranged in columns and includes a list of 16 lectures on the right side.

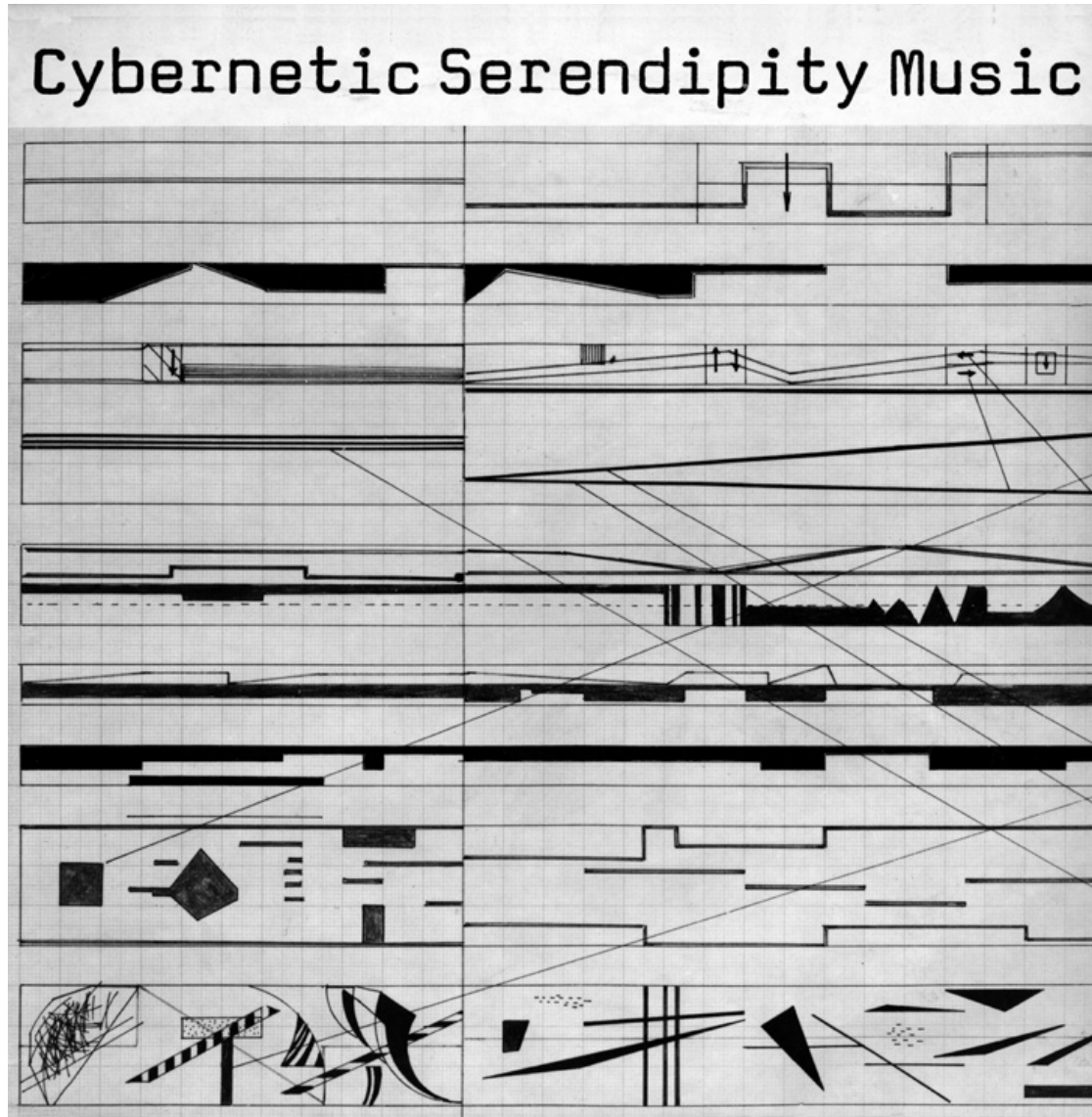
There was no catalogue as such, but this was the publication of the exhibition, a special issue of *Studio International*, and here also is one of the invitations.



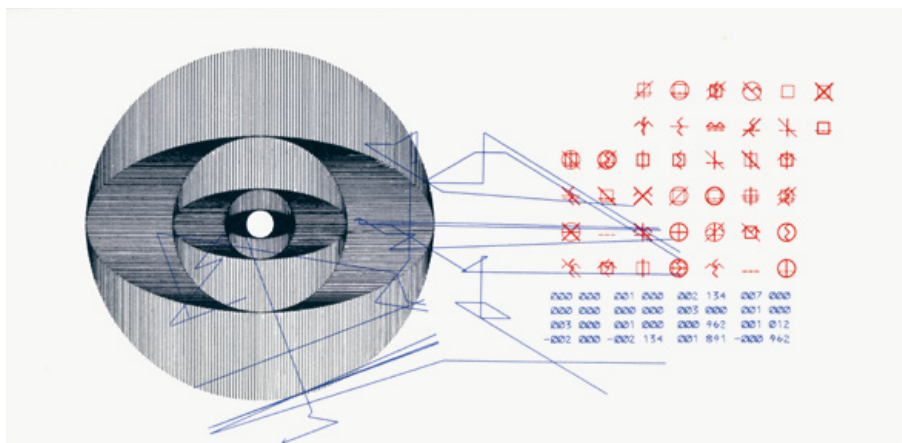
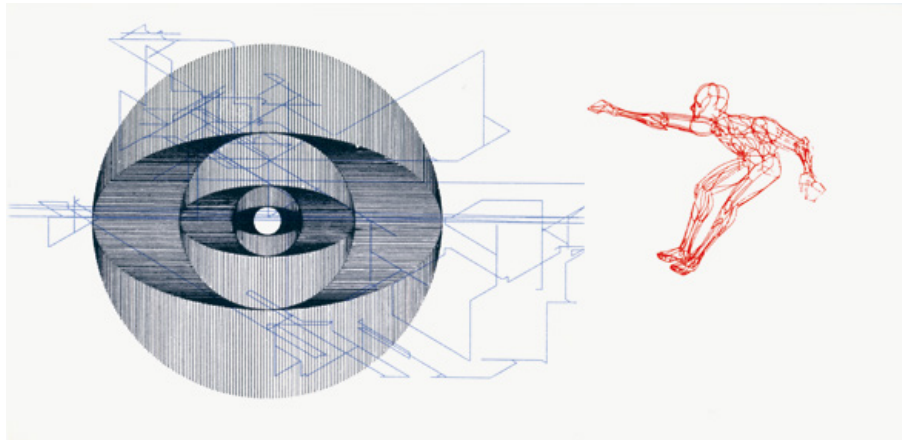
And this is the back cover listing the images incorporated in the design by Franciszka Themerson.



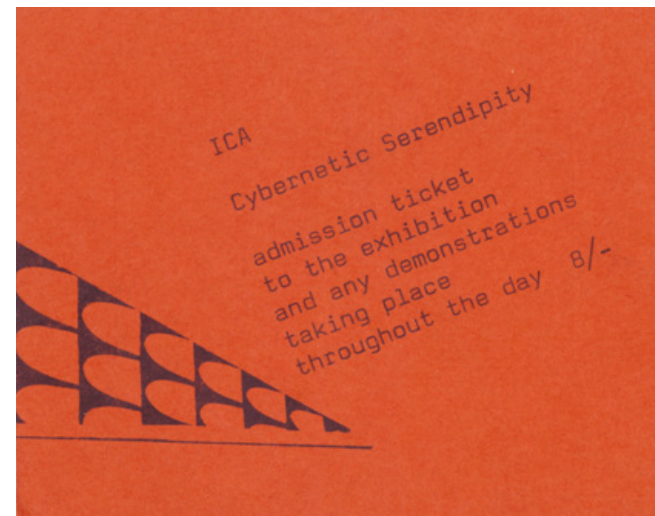
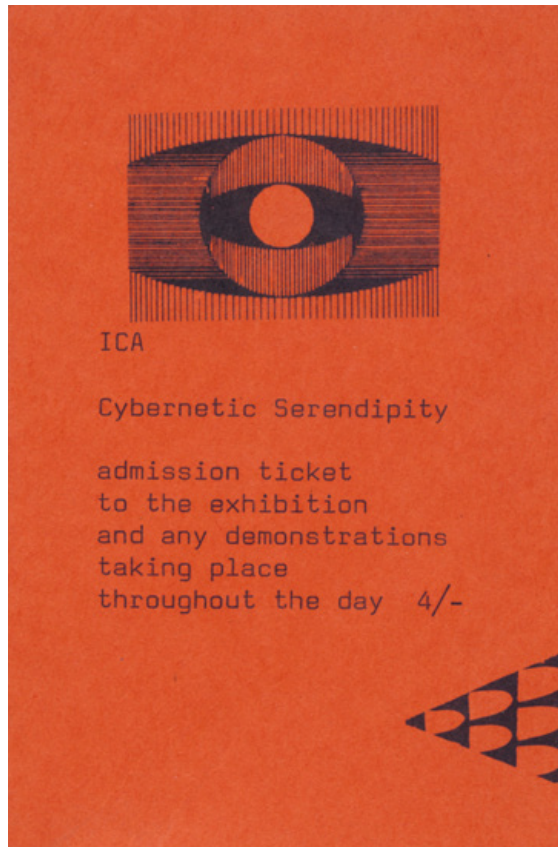
There was also a long-playing record called *Cybernetic Serendipity Music* which included most of the music people could listen to during the exhibition.



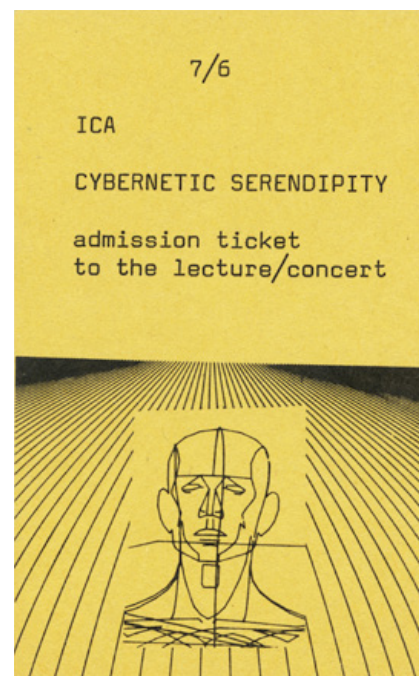
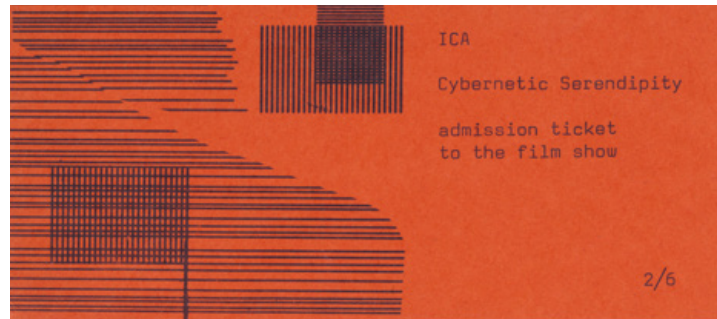
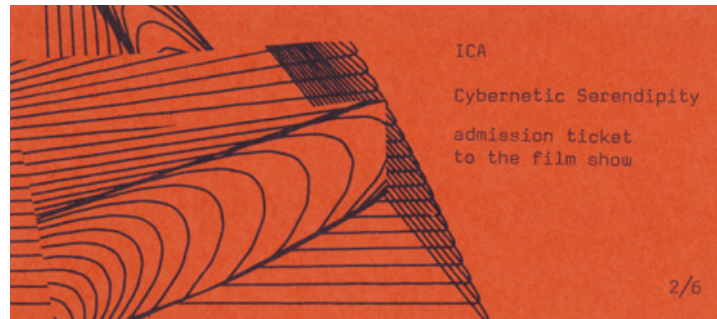
Two invitations to the exhibition. The text on the other side of the one at the top reads: 'You are invited to celebrate the auspicious encounter of cybernetics and art'. The party was on the 1st of August from 9 to 12, and the opening speech was made by Anthony Wedgwood Benn, who was then the Minister of Technology. The card at the bottom was to the private view on the following day.



And here are the admission tickets to the exhibition, lectures and films.



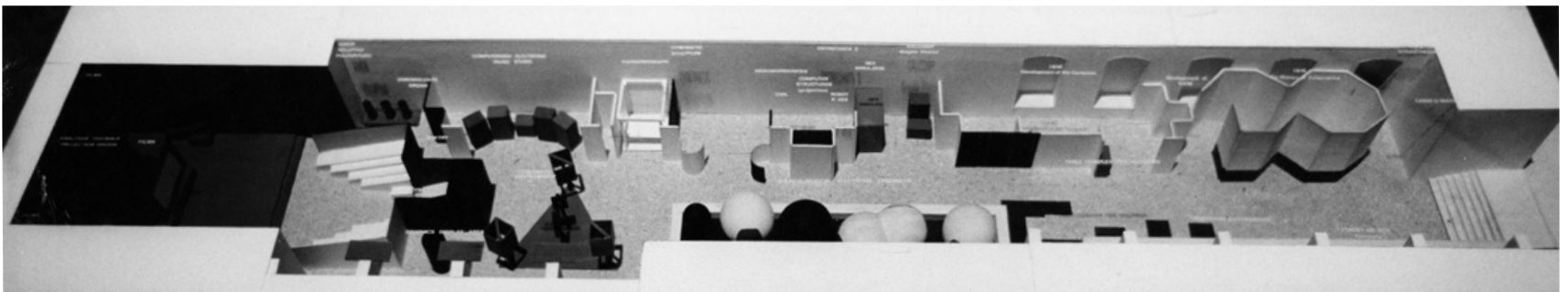
Four more admission tickets.



This is the model of the exhibition.



If you look at the image at the below, the entrance is from the right and the black section on the left is the film viewing area.

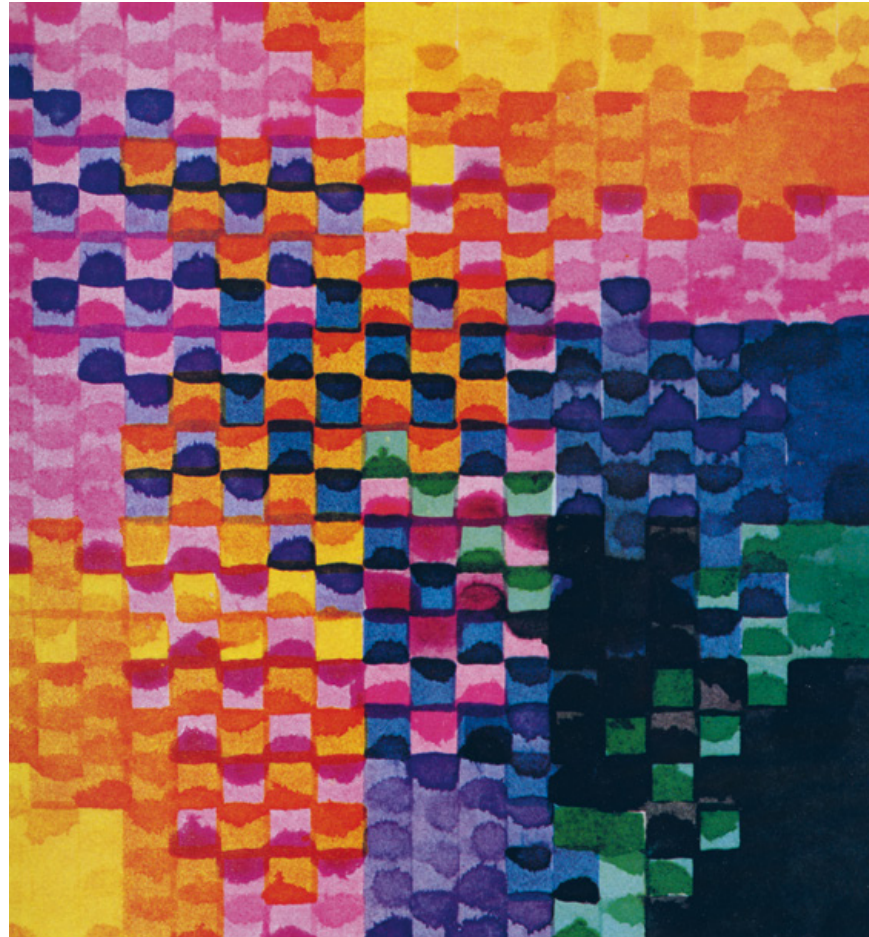


When visitors entered the exhibition, the first thing they saw was a digitised portrait of Norbert Wiener.



Perhaps the portrait of Claude Shannon should have been there too.

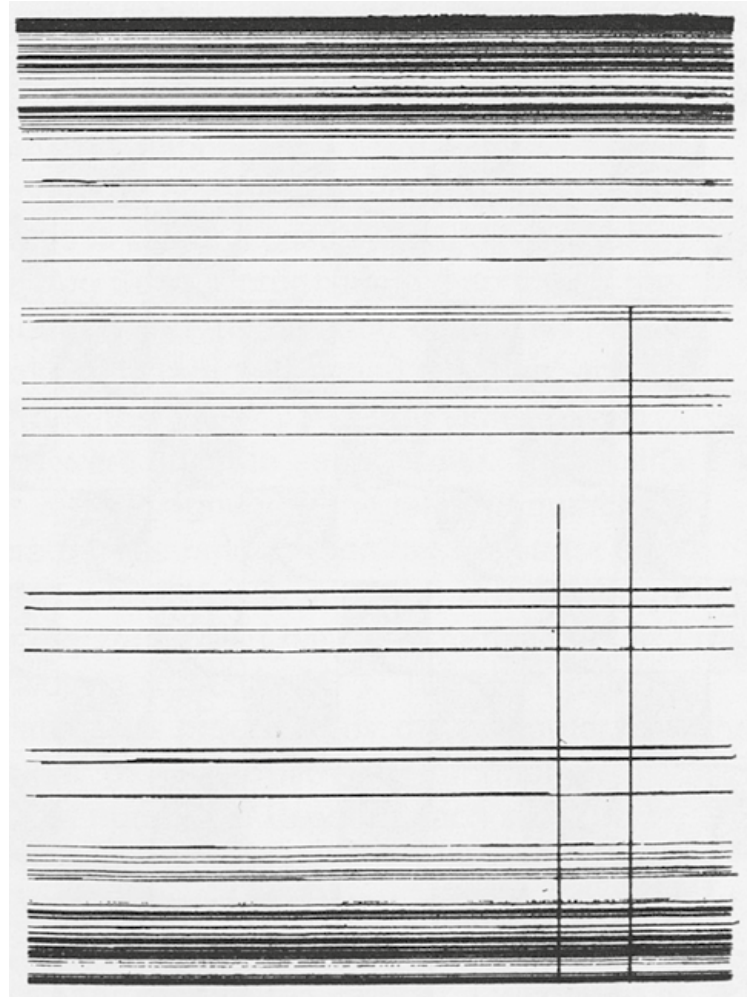
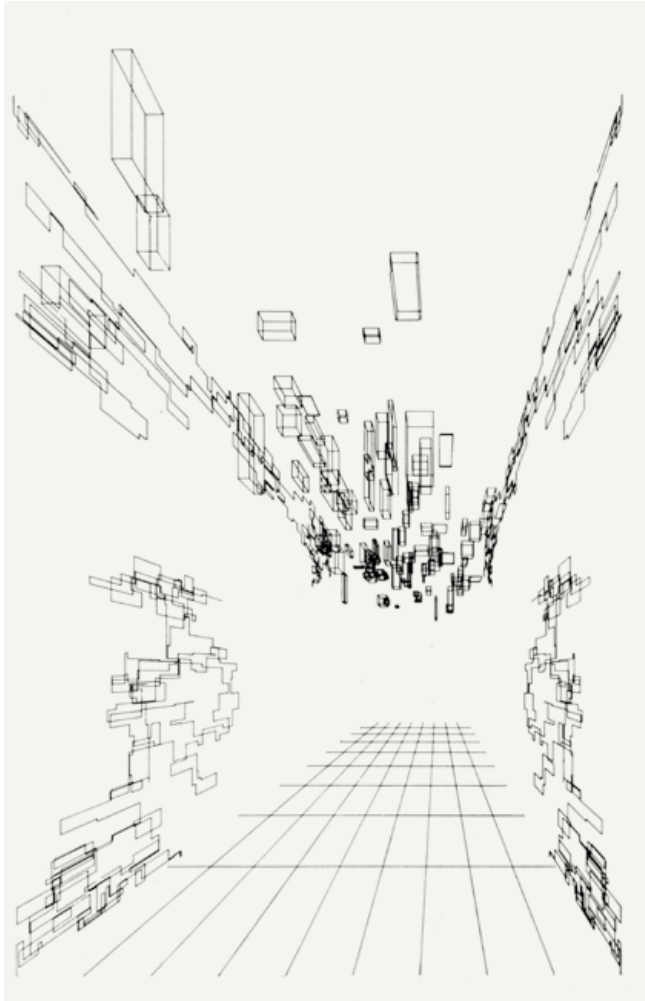
The second thing people would have seen, had they looked down as they walked down the steps leading into the exhibition, was this colour mosaic by Frieder Nake which was projected onto a square of white tiles on the floor.



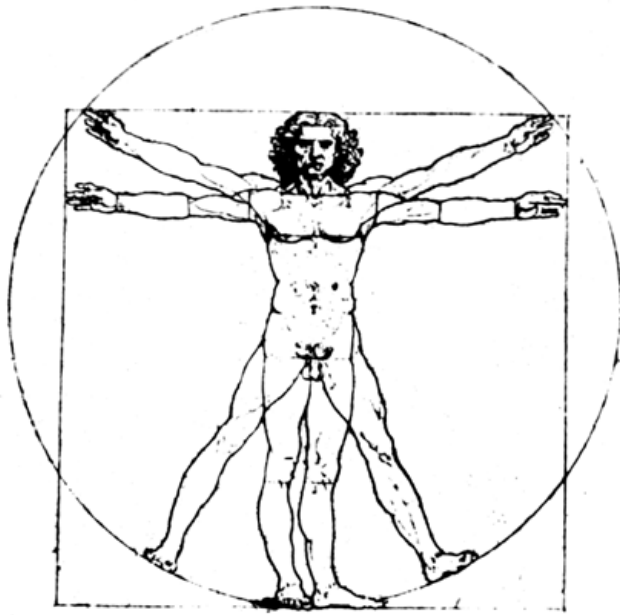
And here it is projected on the floor, that you can see at the bottom of the picture.



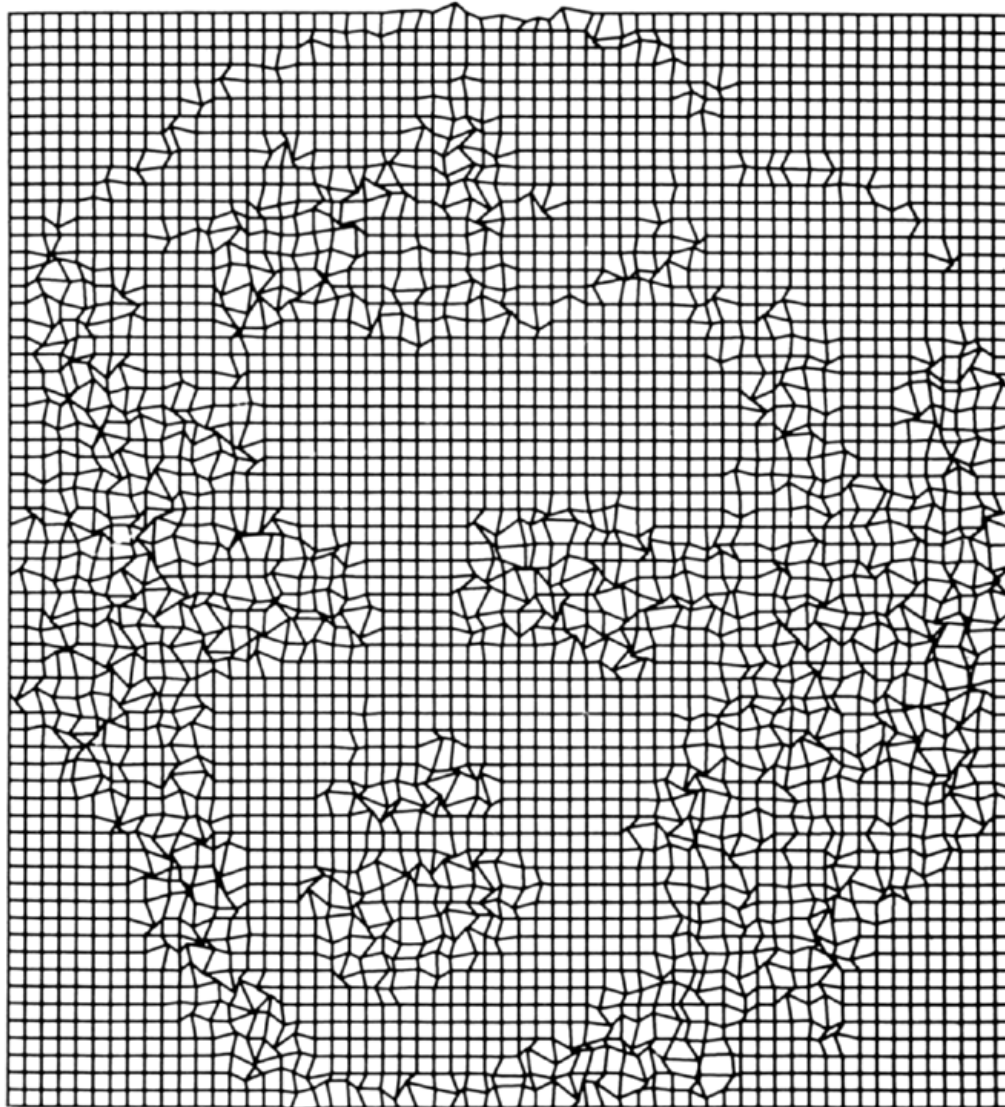
A selection of graphics from the exhibition. Two classic images both by Georg Nees: *Corridor* and, on the right, *Curtain*. This image was 'unintended', discovered by chance, thrown up by the computer while he was working on something else.



Charles Csuri produced a whole suite of circle-to-square transformations using the Vitruvian Man.



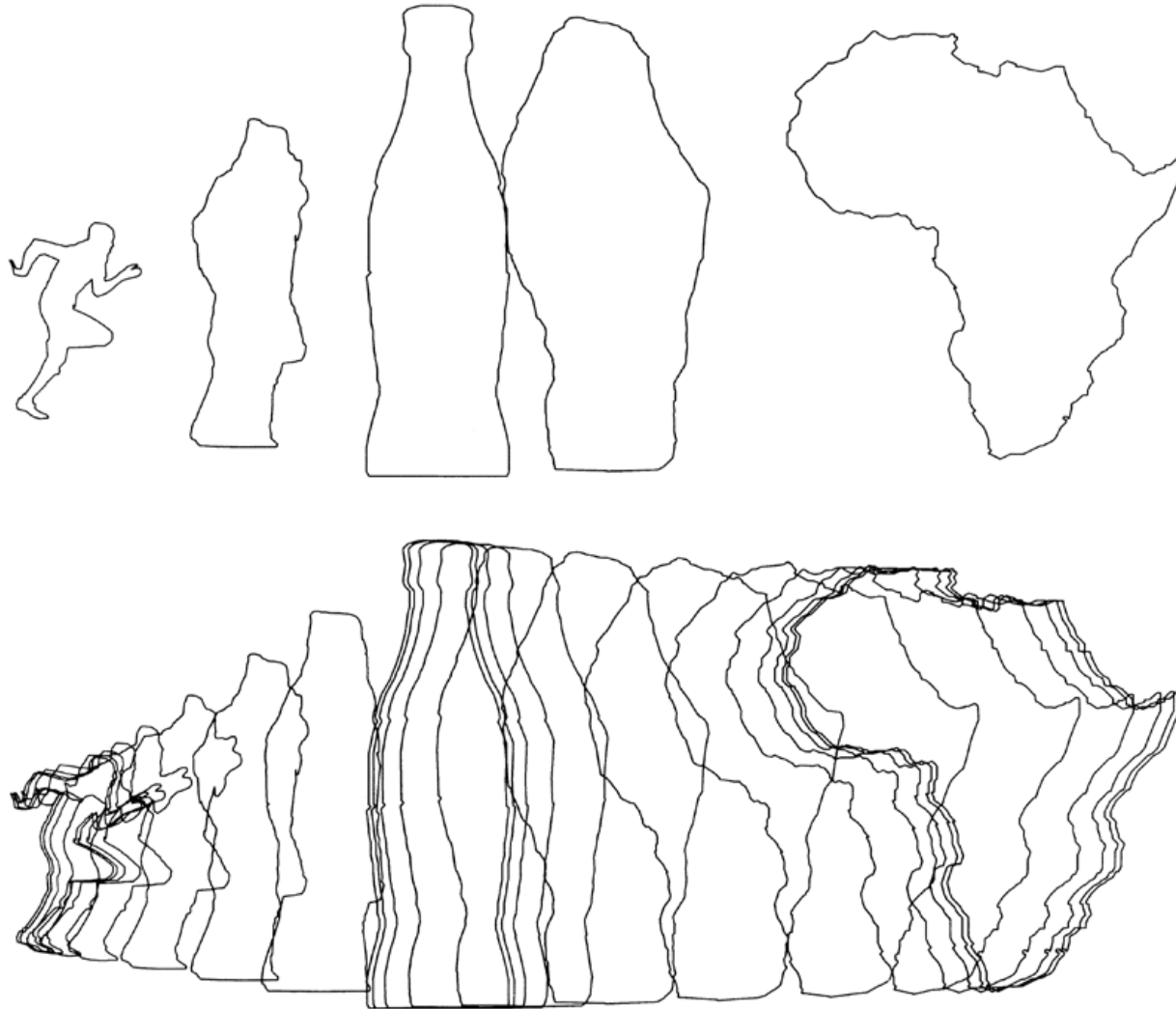
Computer Technique Group from Japan contributed a number of graphics in several groups:
Monroe in the net belongs to a group they called *Deformations*. The program is by Haruki Tsuchiya.



Diffused Kennedy belongs to the same group of works. Program here is by Masao Komura. Data from a photograph of Kennedy is converted into straight lines which are directed to one point, the eye.



One of my favourites is *Running Cola is Africa*, from a series called, *Metamorphoses*.
The term morphing was not used at the time.



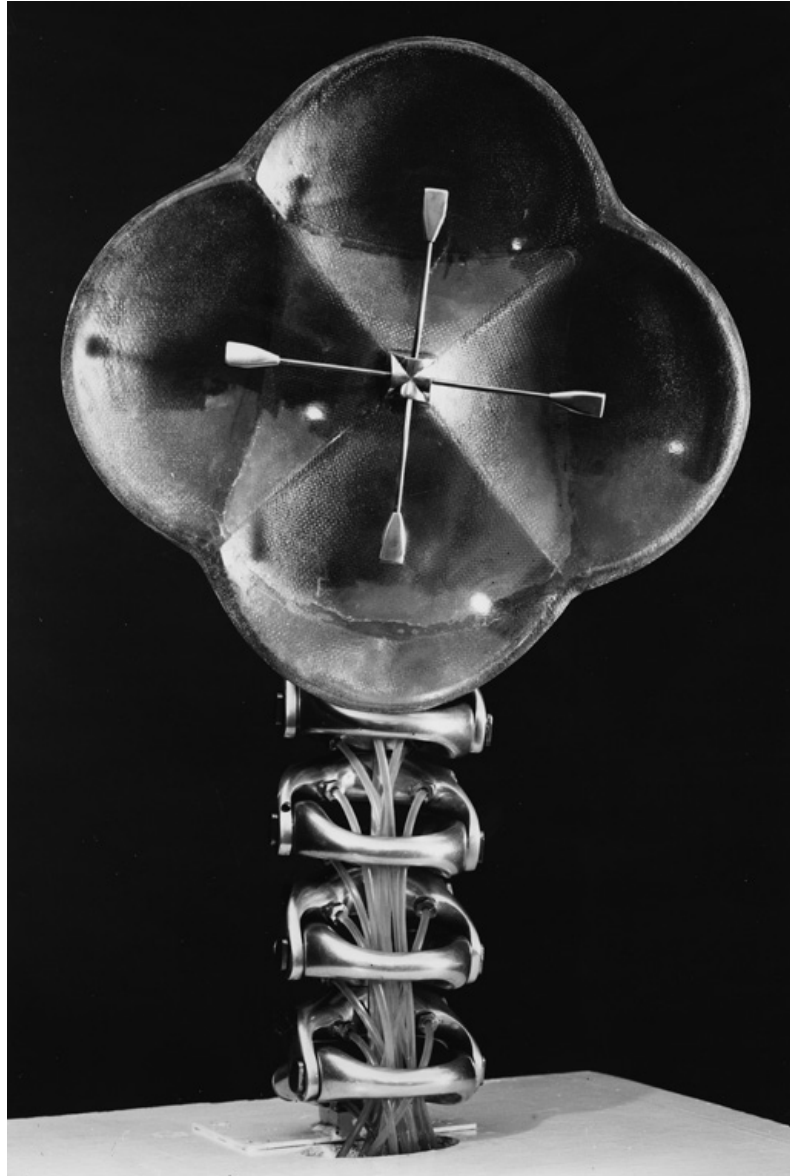
A view of the exhibition. Hanging from the ceiling is a *Scanner* by James Seawright. And, in the centre, there is a demonstration computer for booking airline tickets.



Cybernetic Serendipity with visitors. You can see people trying to communicate with SAM, a sound activated mobile by Edward Ihnatowicz in the foreground.

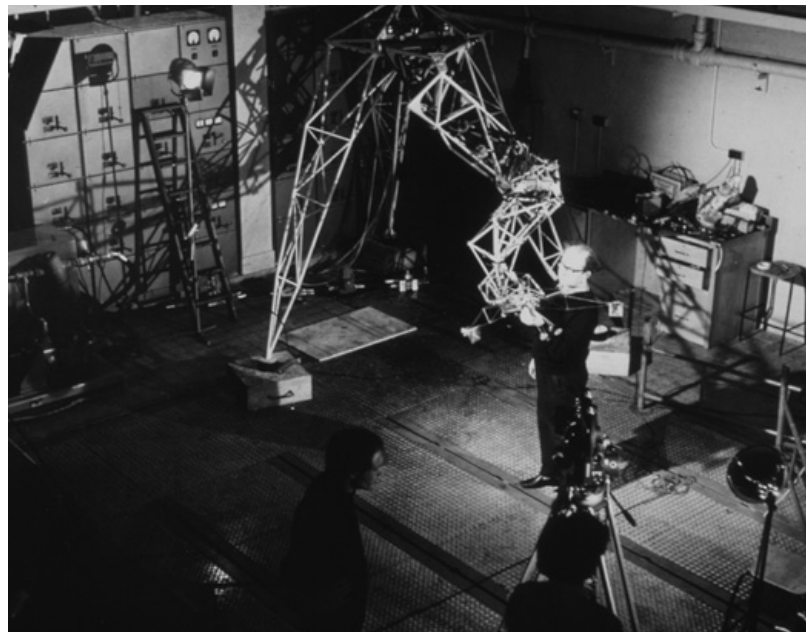


SAM, was a sound activated mobile sculpture. It was an electro-hydraulic structure sensitive to sounds in the environment. When people talked to it quietly, it would bend its flower-like head towards them as if to listen. Children were very good at modulating their voice, but adults tended to be embarrassed and talked too loud for SAM to respond.



This is the creator of SAM, Edward Ihnatowicz, two years later, with his new sculpture, *Senster*, more complicated than SAM, but based on a similar principle. This sculpture was commissioned by Phillips, and for some time was displayed at the Evluon in Eindhoven. It looked like a giant imaginary giraffe. It too responded to sounds and would move towards the sound of a voice. Different sounds elicited different movements. The sculpture turned out to be too popular. Children played truant from school and people organised their marriage ceremonies in front of it. Unfortunately, at some point, Phillips decided that they'd had enough. The sculpture was dismantled, and to my knowledge, most of the pieces were lost.

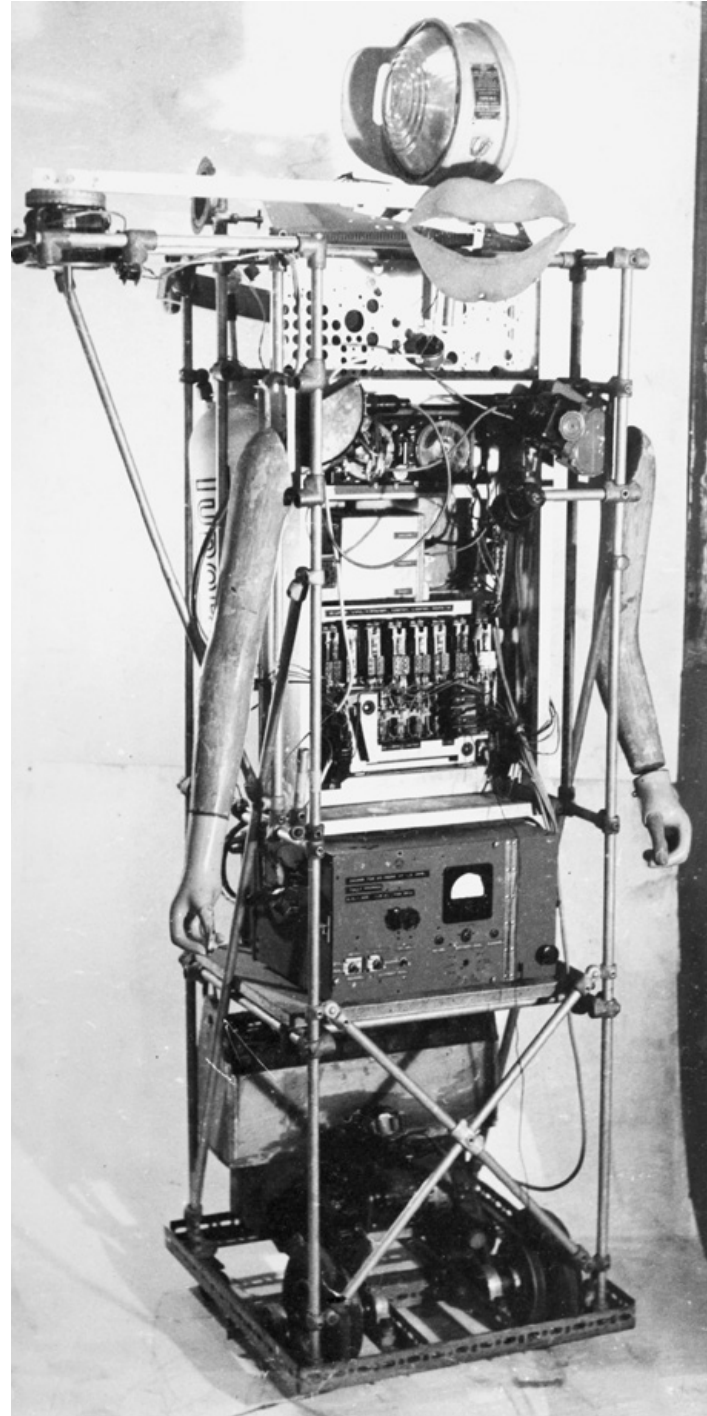
I think that it has been rebuilt since.

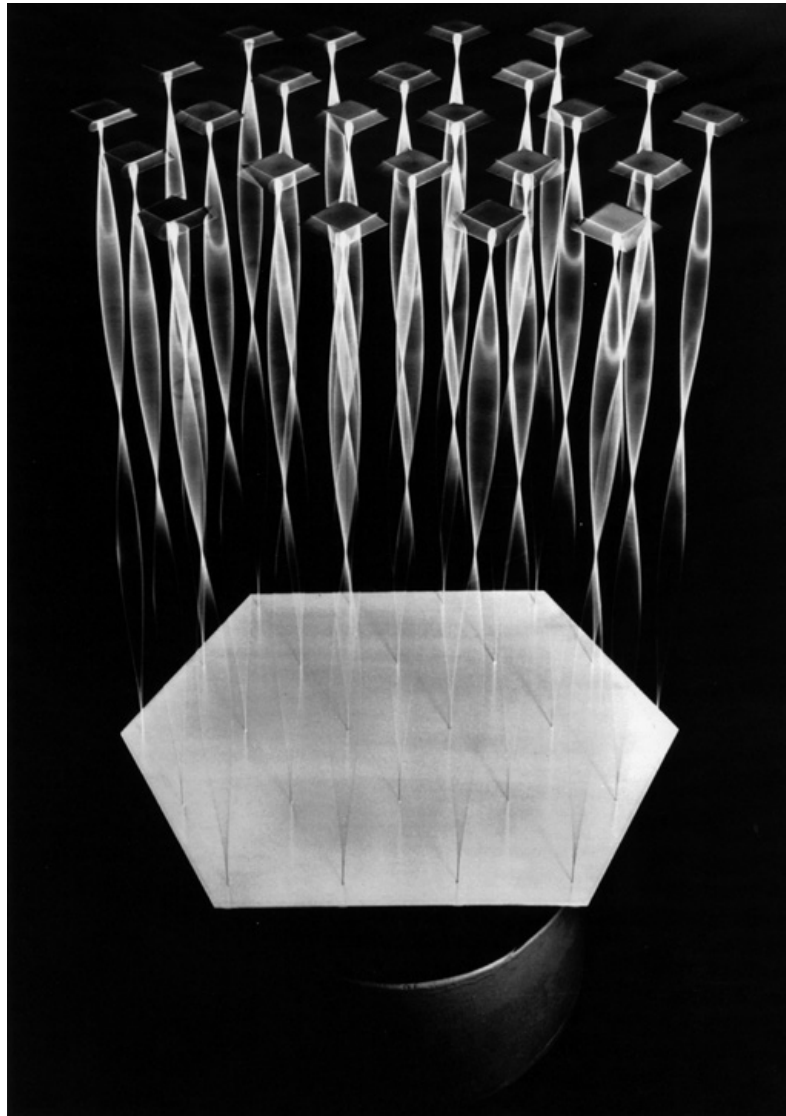


Back to the exhibition. One of the two robots by Bruce Lacey. She had very large lips on an extendable arm and would thrust them at the visitors. Below you can only see her back.



And here you can see her dangerous lips.

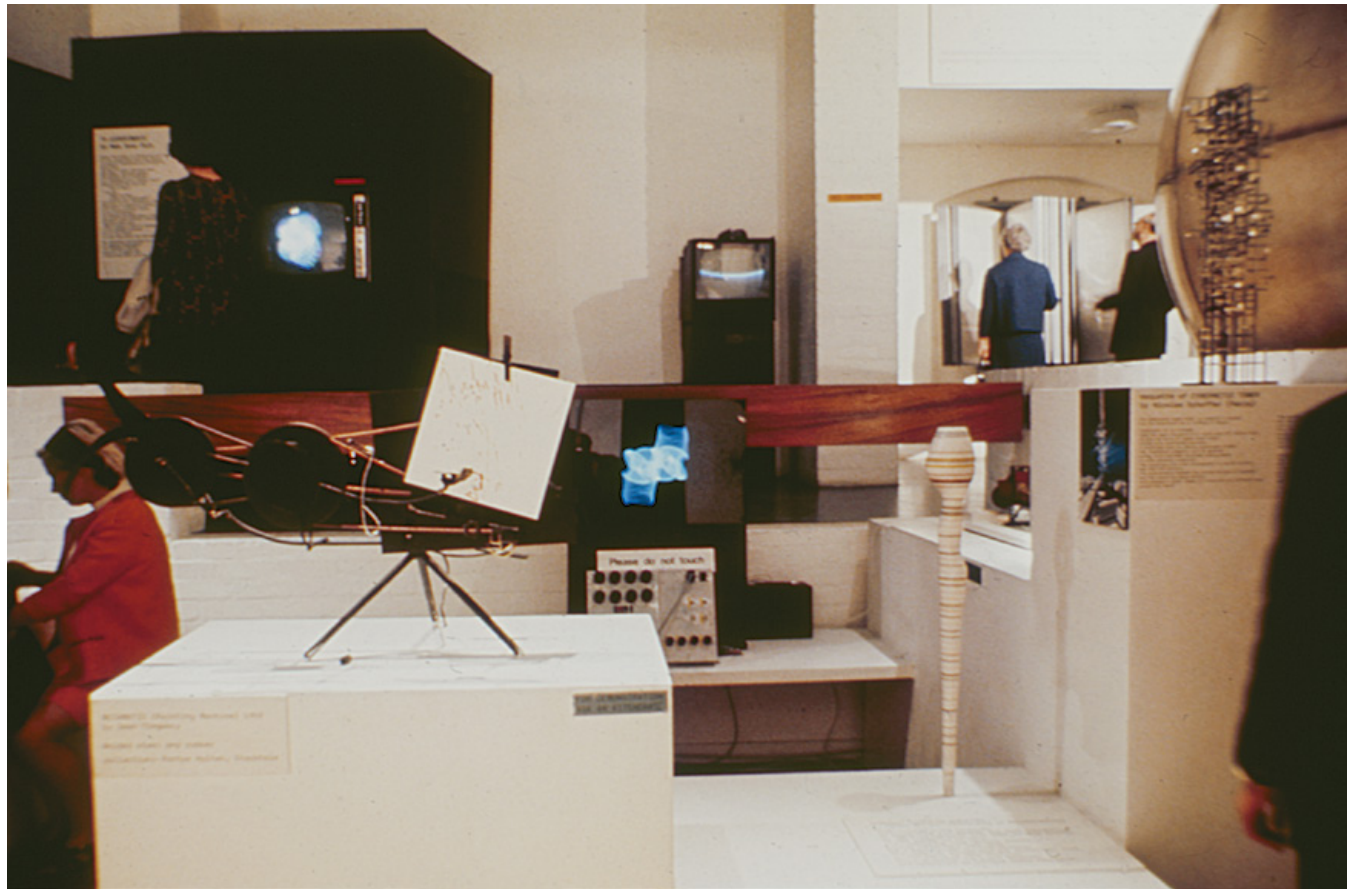




The cybernetic sculpture by Wen Ying Tsai. The steel rods vibrate in constant harmonic motion. But sounds, such as clapping altered the frequency of the strobe flash which made the rods appear to undulate.



On the other side was Tinguely painting machine of 1959. On the right, the thin vertical object made of laminated wood is a computer-generated sculpture by Robert Mallary.



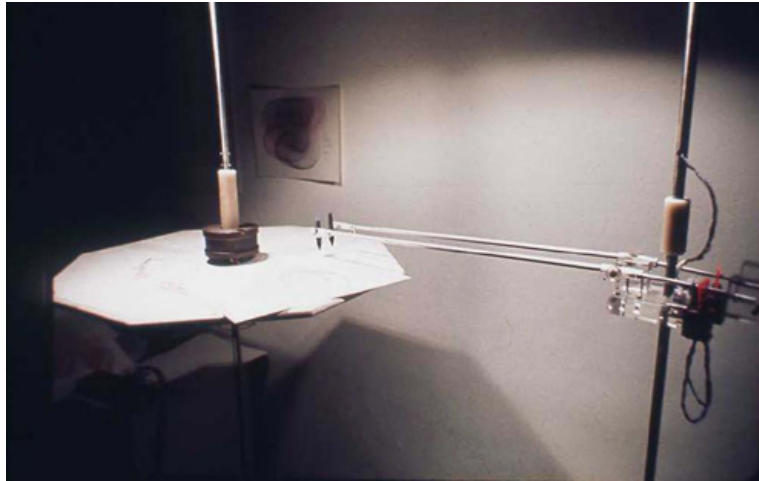
And here is the sort of image that the Tinguely machine produced. When Tinguely was in London, he signed the drawings that were produced while he was there.



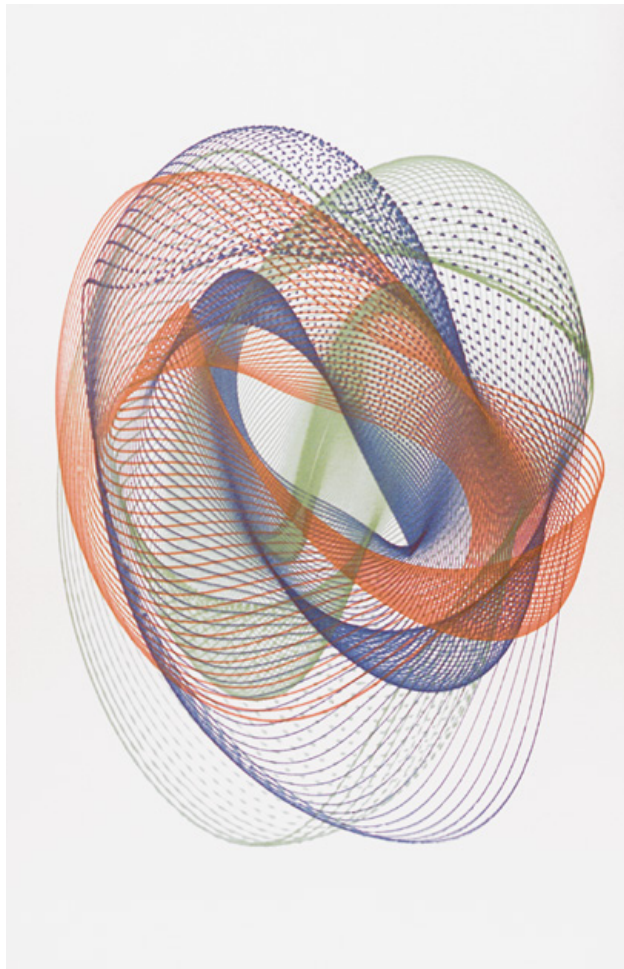
There were also other drawing machines, including several harmonographs. This was one of them by John Ravillious. The special property of this drawing machine was that once a random pattern was satisfactory, it could be repeated.



And this is another drawing machine



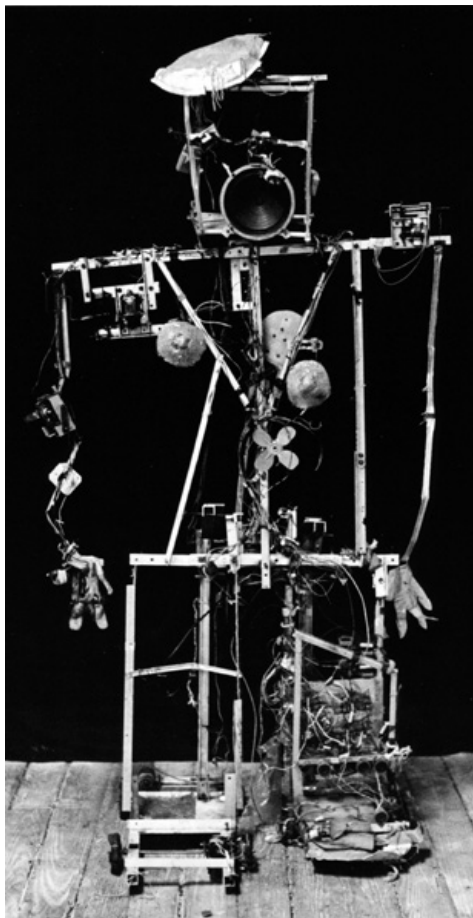
and the sort of drawing it produced.



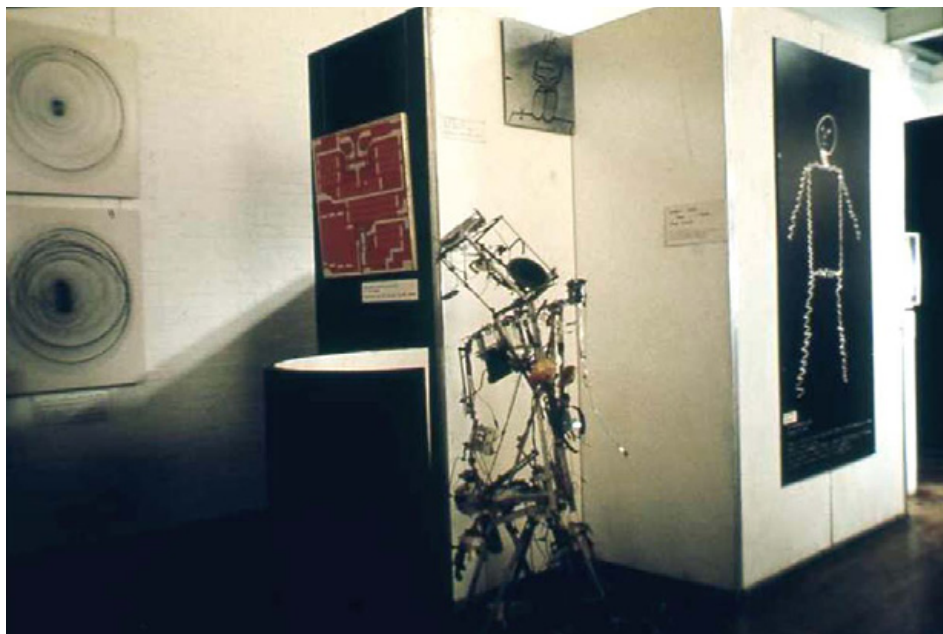
Each machine had to have an attendant to supply paper and inks.

In the centre on a stand is the recreation of Ramon Lull's logic machine and on the left, Nam Jun Paik's robot

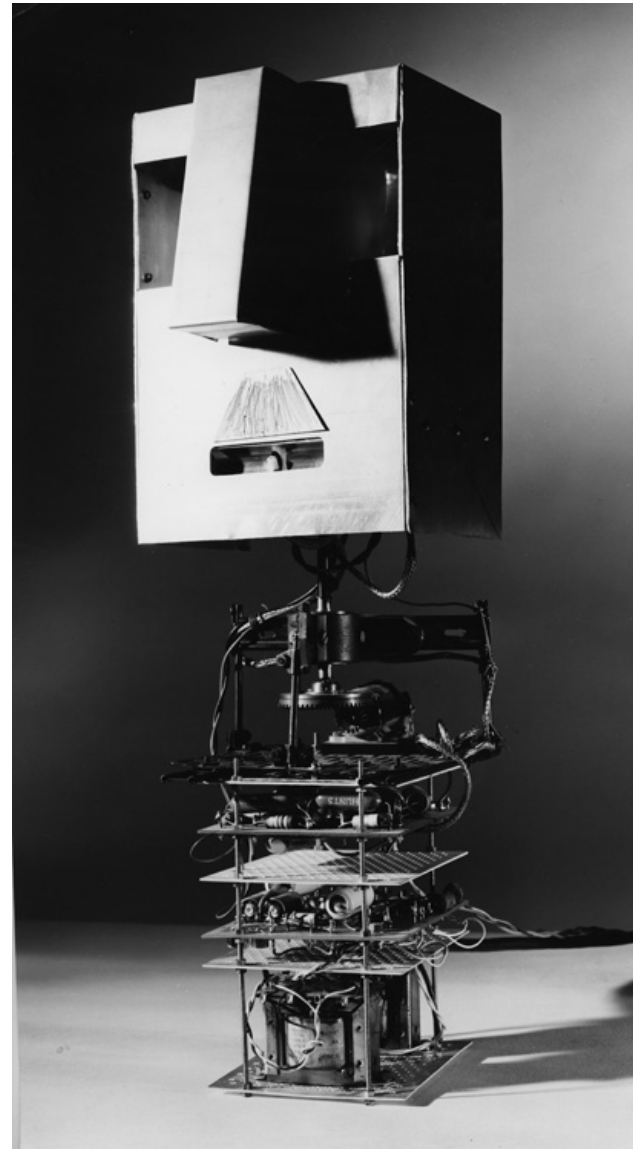
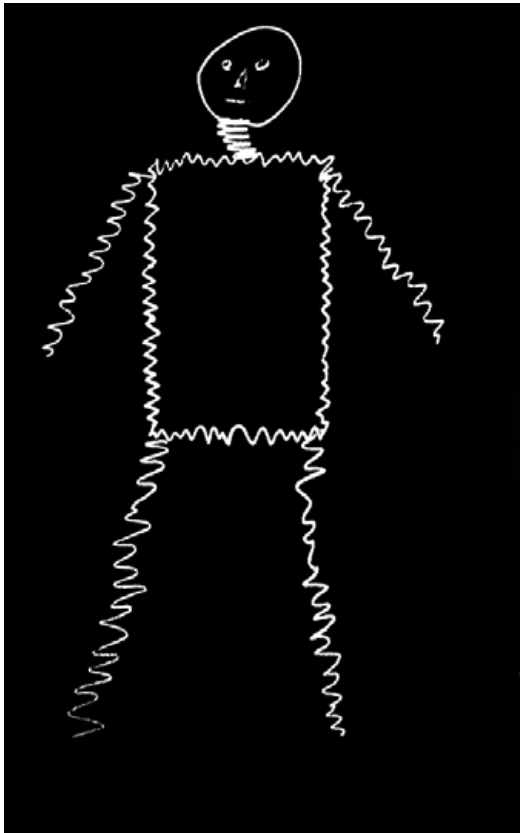




Here is a better view of Nam Jun Paik's robot, and you can also see the red painting of a micro circuit by Ulla Wiggen.



A child's drawing of a mechanical boy, and a robot by John Billingsley called Albert, whose main action was to turn his head.



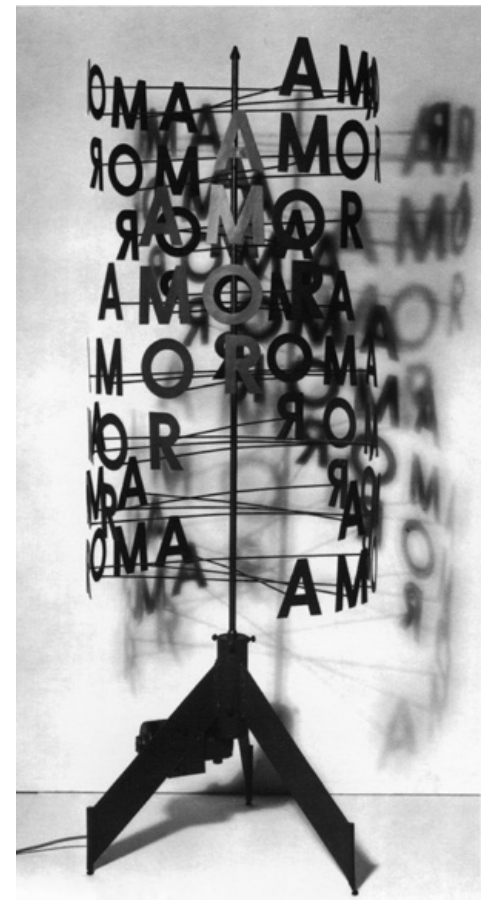
Zinovieff's computer which improvised on tunes whistled into the microphone.



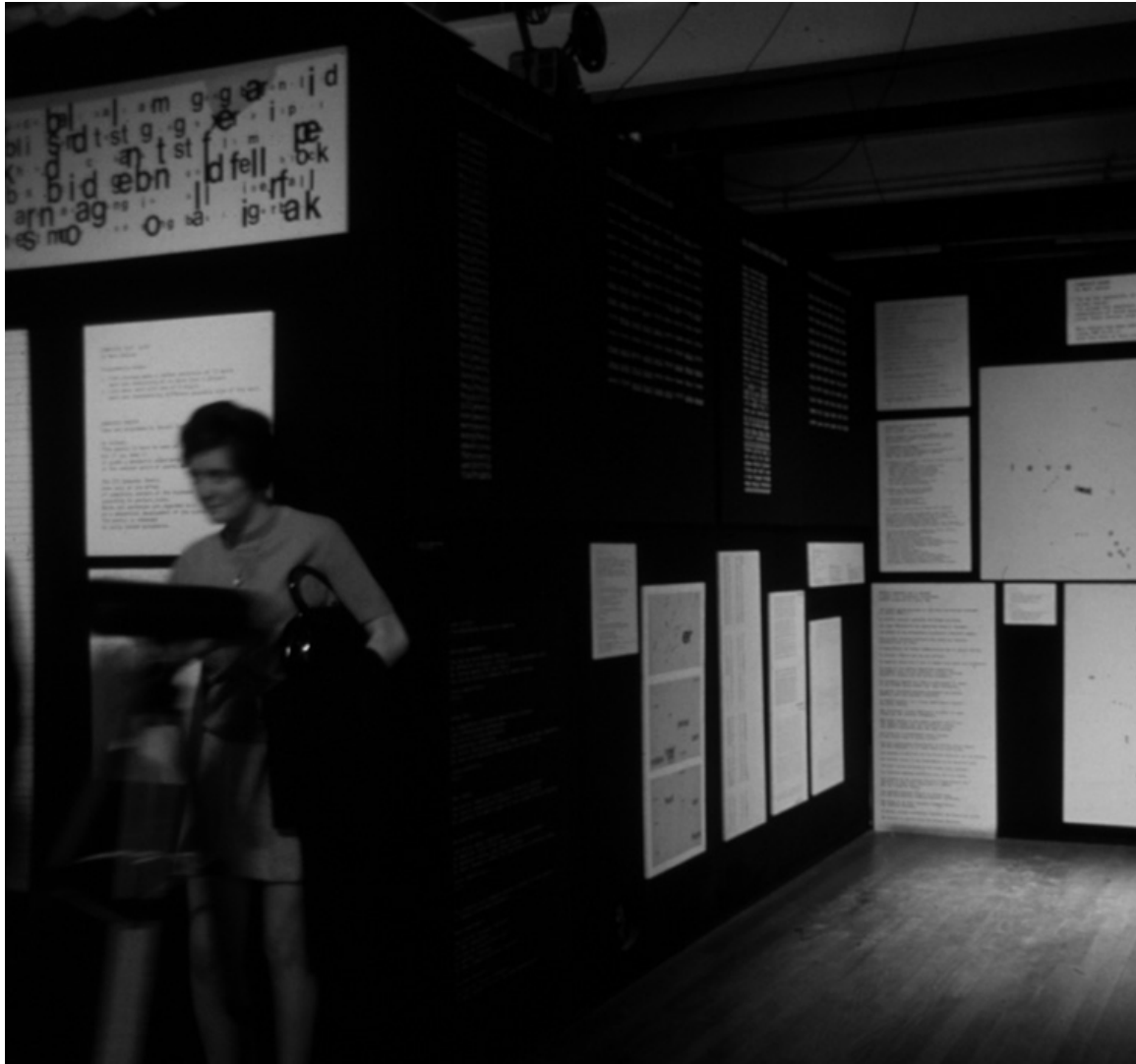
It was later replaced with music scores and cushions celebrating Mozart's dice game for randomly generating music.



And here we approach the section with computer poems and texts. The sculpture on the right is Ken Cox's kinetic sculpture composed of letters cut out of a sheet of metal. You see it in colour at the back on the left. It was called *Amor, Voluptas, Pulchritudo*, and these three words, or elements in constant rotation interacted with each other in a random fashion.



Here we have computer poems and texts.



Two of the haiku and a report in *The Times* about the prolific production of computer poems in 1964.

ALL GREEN IN THE LEAVES
I SMELL DARK POOLS IN THE TREES
CRASH THE MOON HAS FLED
EONS DEEP IN THE ICE
I PAINT ALL TIME IN A WHORL
BANG THE SLUDGE HAS CRACKED

COMPUTER TURNS OUT 30 POEMS A MINUTE

AUTOMATION MOVES INTO LITERATURE

FROM OUR OWN CORRESPONDENT

WASHINGTON, JUNE 23

A computer has been taught, or programmed, to use the correct word, to write poetry. Not great poetry, but readable lines, and what is more, its electronic literary output is a steady 30 poems a minute, which may reach 500 a minute when its vocabulary is increased.

This cybernetic breakthrough was achieved by Mr. Richard Ragan, a high school student of Tallahassee, Florida, who, according to the *Miami Herald*, has been doodling with a computer. He is not particularly anxious to add automation to the burden of poets, already a depressed class, but says of the IBM 709 computer, "if you work this right, you'll get some verse".

Here is one of his, or rather, one of their joint successes:

"Suddenly the deserted fields glowed
Above the heavy guns
As the grass slashed
The dark reality grew harshly."

And another:

"Silently the crystal fields floated
Against the deserted mountainside
As the moon rose
The serene landscape glowed darkly."

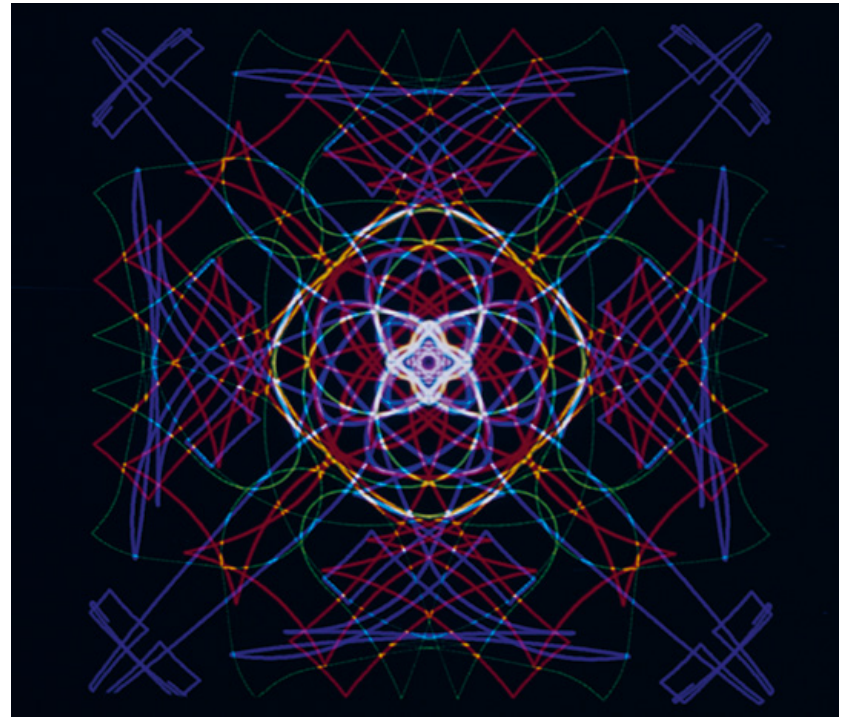
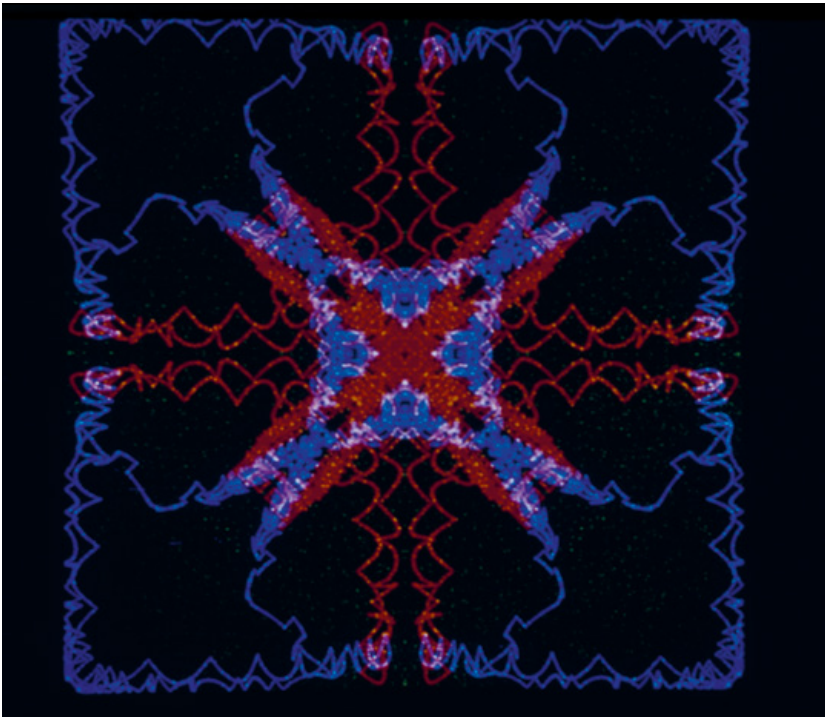
REAL CHALLENGE

Mr. Ragan gave the machine 15 nouns and 10 of what he called noun-phrases, such as: the men, the dog, and the heart. Next he added 13 verbs in the past tense, 13 prepositions, 16 adverbs, and 10 adjectival phrases such as: the dark, the serene, and the deserted.

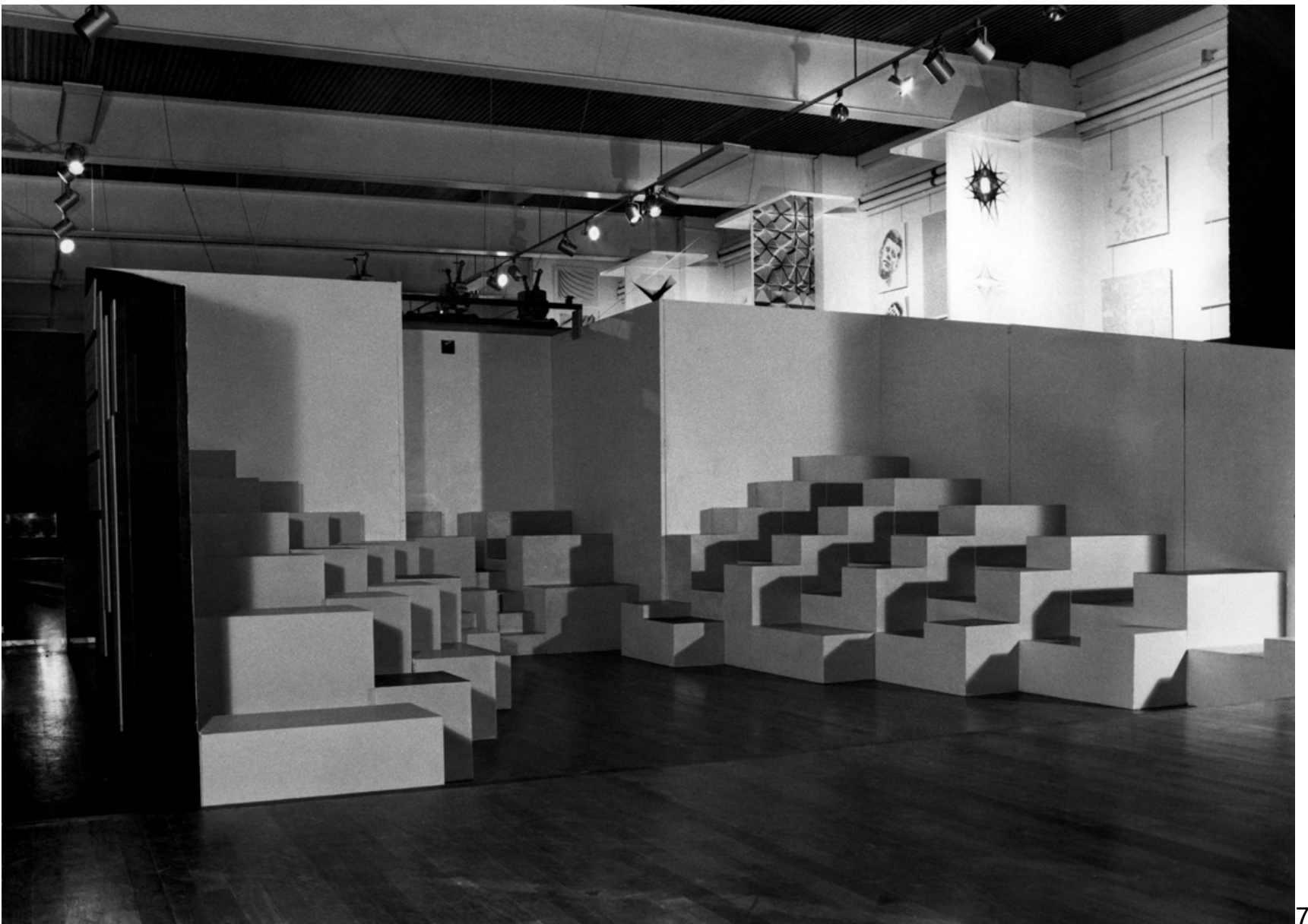
He then fed in programmed cards constructing lines of, for instance, an adverb, an adjectival phrase, a noun and a verb. The computer, which is capable of 42,000 additions a second, did the rest.

Mr. Ragan is reported not to be content with this remarkable achievement, and is speaking of using the computer to translate Spanish poetry. This is regarded as a real challenge; the Central Intelligence Agency, which paid Georgetown University more than \$1m. or £357,000, to translate Soviet technical journals by computers, last year decided that it could not be done. Indeed the computer appeared to admit defeat when, it translated the following from the Russian: "A studied above machine at all has not intuition, it has only accurate the data . . ."

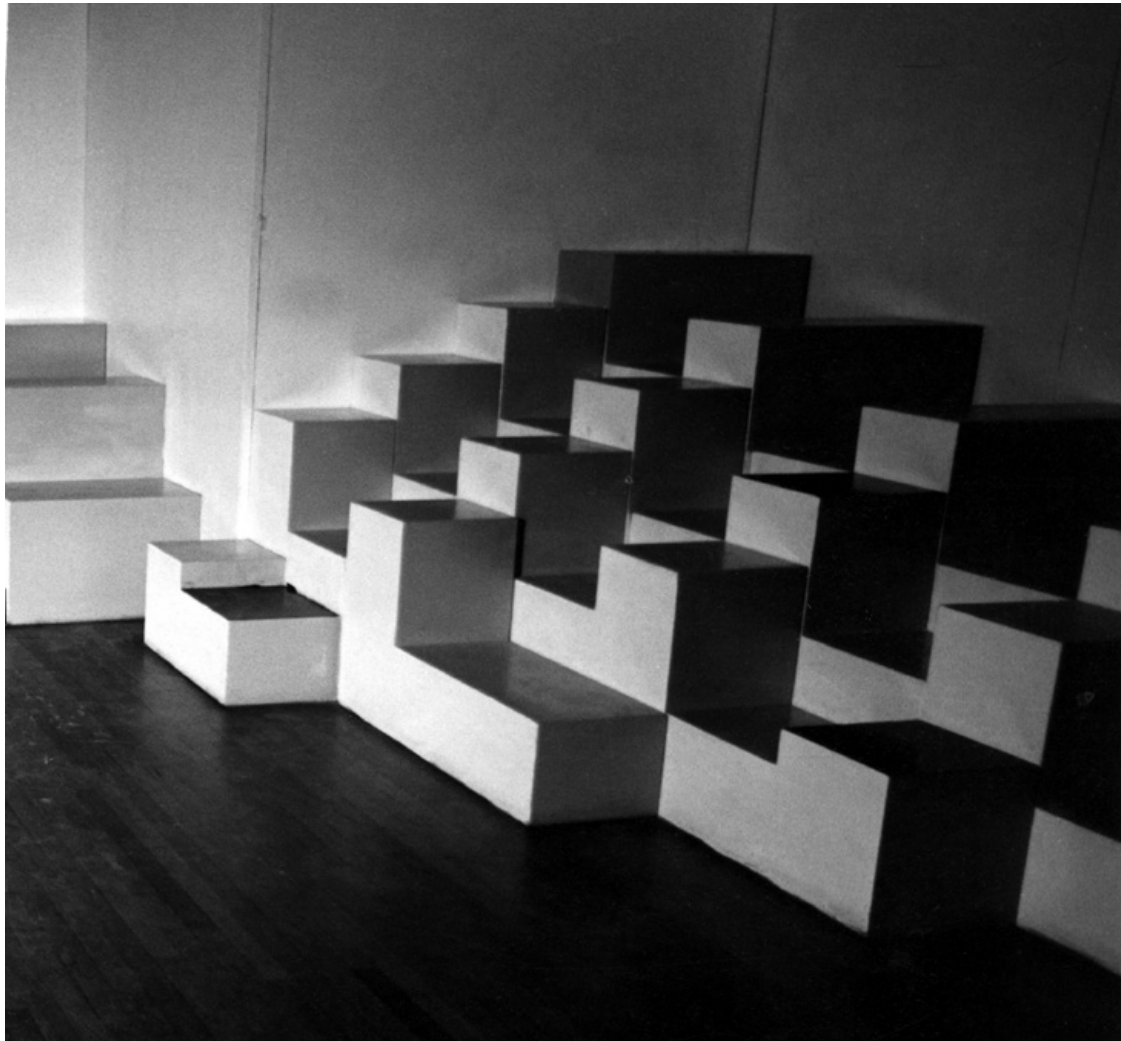
Stills from one of the films that was shown in the cinema section at the end of the gallery.



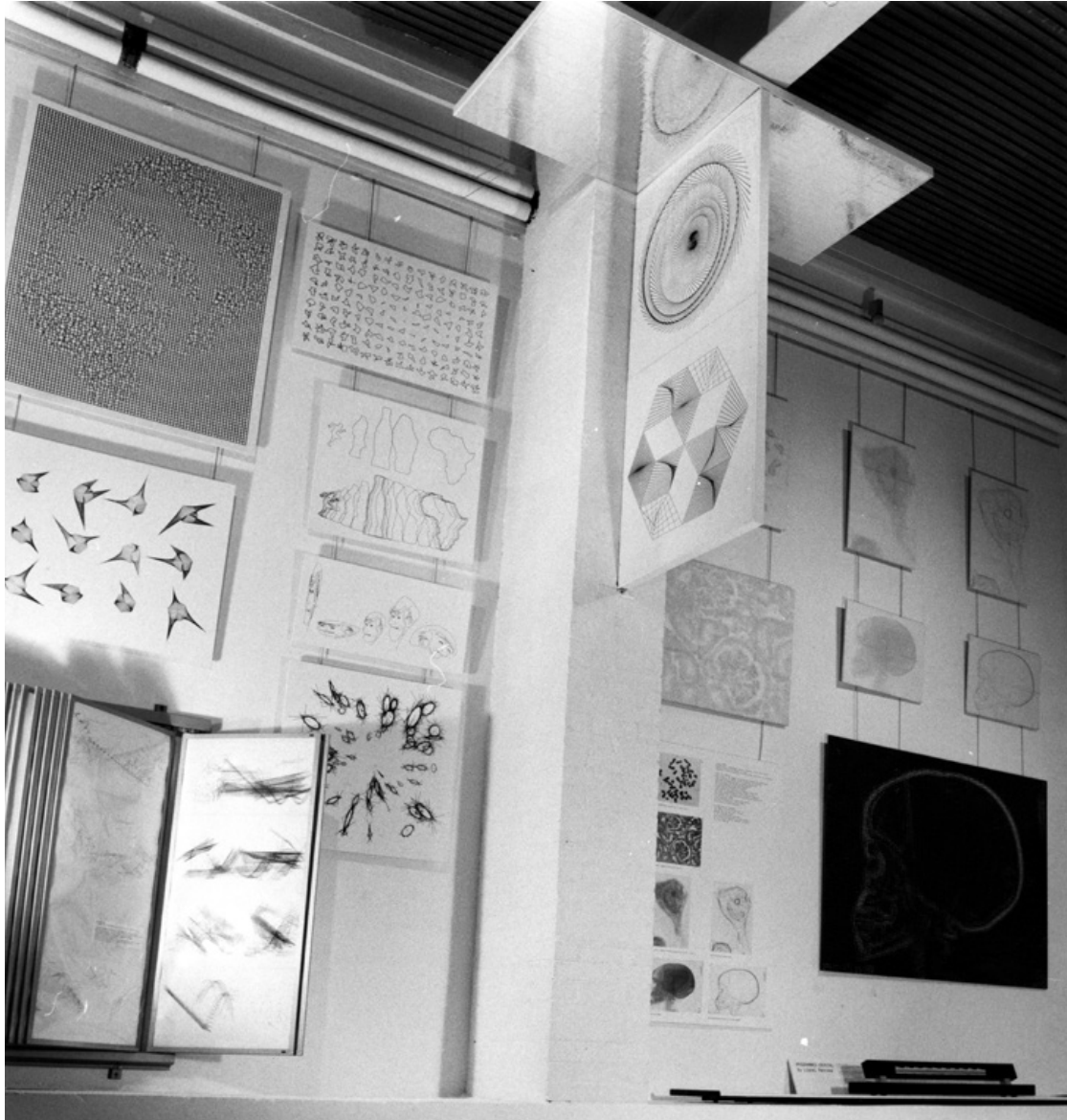
And this is what the cinema looked like. The seating was based on cubes. They were painted grey and looked like a constructivist sculpture.



Another view of the cinema.



A view of the graphics section. Many of them were accompanied by their programs. Some were in the size and on paper that emerged from the plotter, these were in the display units with hinged panels, others were enlarged and shown on the walls.

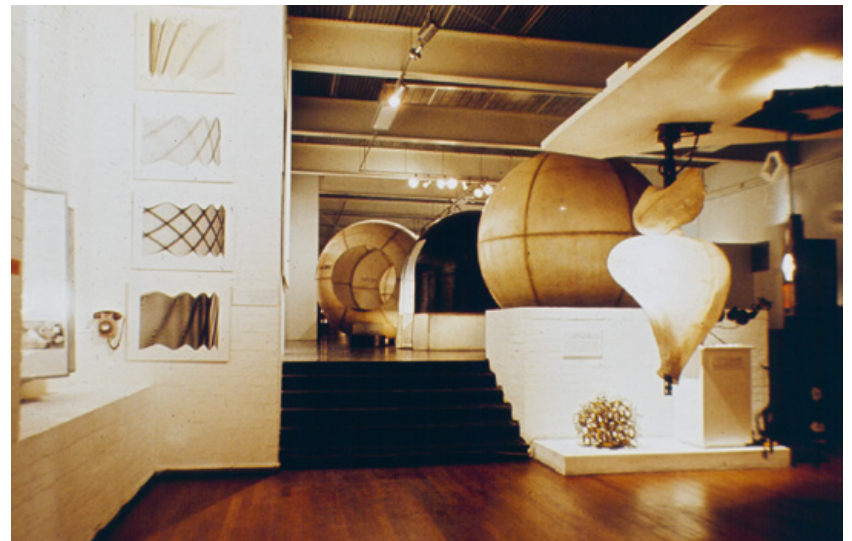


The Colloquy of Mobiles by Gordon Pask. This is an environment with six figures featuring a dialogue between three male and three female forms. The males are in the centre, the bulbous females designed by Yolanda Sonnabend, are outside. They communicated with one another, competing and co-operating. This complex interaction was effected by sounds, as well as by projected lights (from the males), and reflected lights (from the females). The audience could also participate in the game once they understood the *Colloquy's* goals and frustrations.

Cysp is in the background on the right.



Two slightly different views of the exhibition which include the music section, and the five music spheres, of which one was black, on the right.



Another view. On the left were a series of music scores.



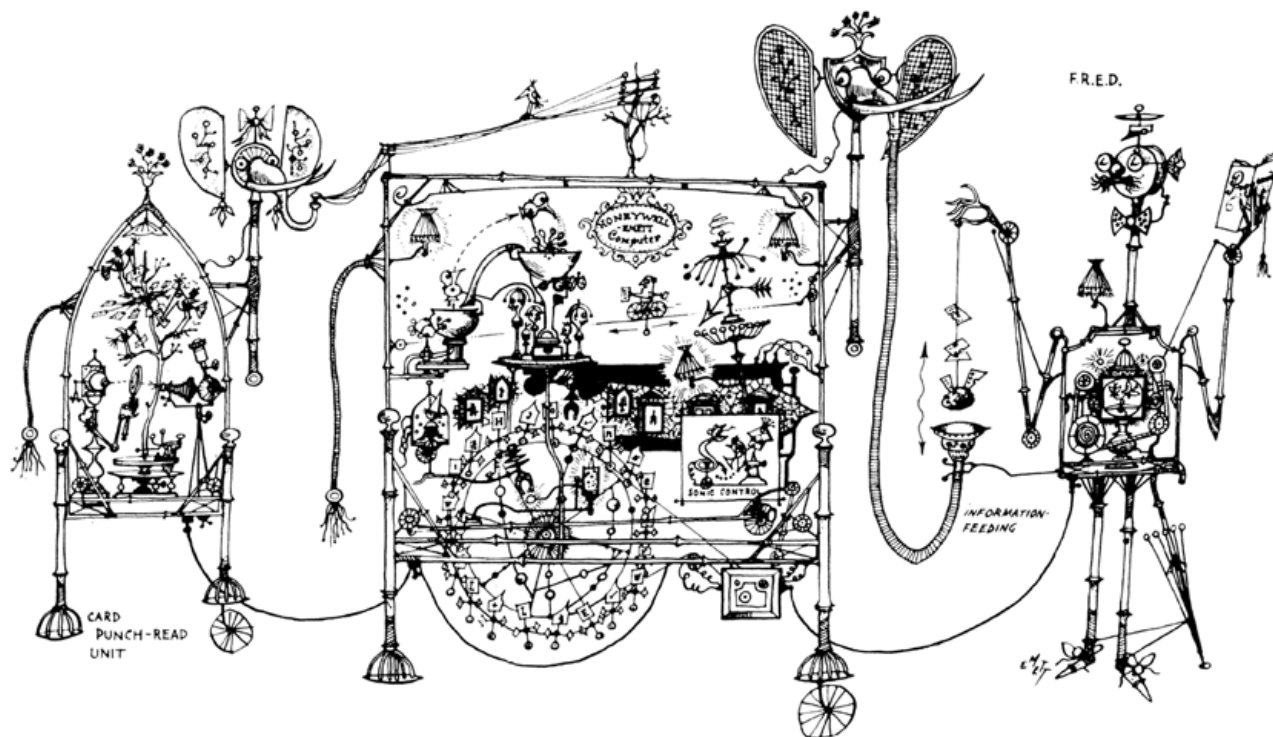
And here is one of the spheres in which people could listen to computer composed and played music. Each sphere had a different selection of compositions.



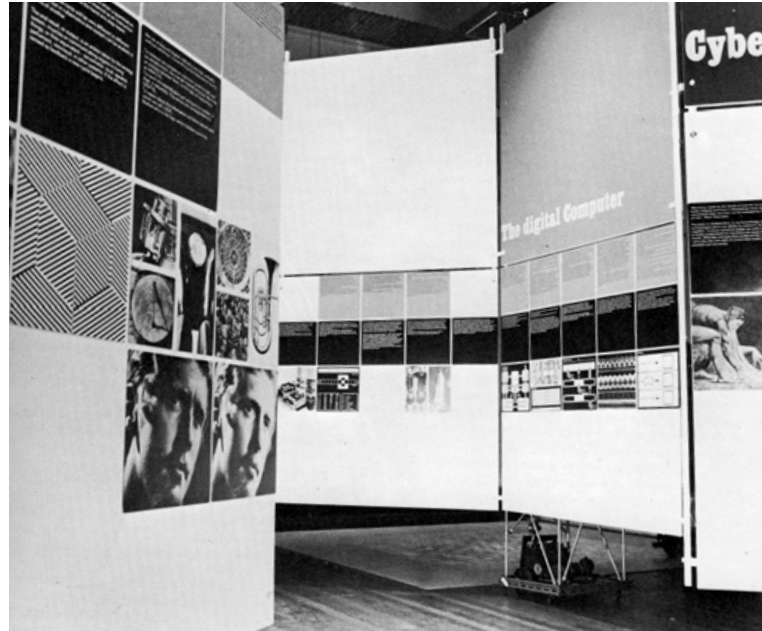
On the way out of the exhibition you see Nam Jun Paik's transformed television images and the shining sculpture in the distance is the Honeywell-Emett forget-me-not computer.



The forget-me-not computer is better visible in the drawing.



There was also a whole section about the history of cybernetics which was compiled by Morris Trask of IBM and which was later published as a small book.




So that was that.

But I want to mention two magazines that were published during the exhibition.

These are the covers of the first issue with Lowell Nesbitt's computer painting



Covers of the second issue quote reviews and offer handwritten notes about the show.



'Cybernetic Serendipity' provokes, in its implications, it is as different from an every day 'art exhibition' as a major operation from a manicure... it is an experience which no one should miss.
John Russell, The Sunday Times

September 1968 No.6 Price 2/6

The Magazine of the Institute of Contemporary Arts

CYBERNETIC . SERENDIPITY

The winking lights
the flickering television screens
and the squawks from the music machines
are signalling the end of abstract art;
When machines can do it,
it will not be worth doing -
Robert Melville, New Statesman

Gasia Reichardt asked Norman to design the cover of the Institute of Contemporary Arts magazine. First I thought I could do a drawing depicting part of the exhibition, or a cartoon making some whimsical comment. Another words, or were to me was to describe in some of the things that were in the organizing of this exhibition. For example were some three hundred and twenty five persons involved to make this show possible. Plus the fact that it took 1,095 days to bring it to fruition. Some seven hundred press invitations were sent out, and more than three thousand people attended the private views.

A joyous exhibition.
It demonstrates that art can live with modern science.
Daily Mirror

Anyone unable to visit the exhibition, or driven prematurely away from it by some of the noisier pieces on display, would do well to get the 25s catalogue and information conspectus of the exhibition and its technical and theoretical background.
The Times Literary Supplement

Is everything or anything here art - and if not, why not?
We all benefit by asking ourselves this kind of question, and no more enjoyable way of provoking it can be imagined than an hour in this intriguing lively and thought-provoking show.
Nigel Gosling, The Observer

me Toynton for the thing that occurred visually involved there

But as unique show of fresh ideas about trends in contemporary art-making this is a stimulating exhibition for everyone.
Daily Telegraph

Where in London could you take a hippy a computer programmer a ten-year-old schoolboy and guarantee that each would be perfectly happy for an hour without you having to lift a finger to entertain them. From today, there is just one such place - The Institute of Contemporary Arts.
The Evening Standard

I think that the computer may be able not so much to enlarge our concepts of art as to widen immeasurably our knowledge of what is not art.
Alexander Weatherston, Art and Artists

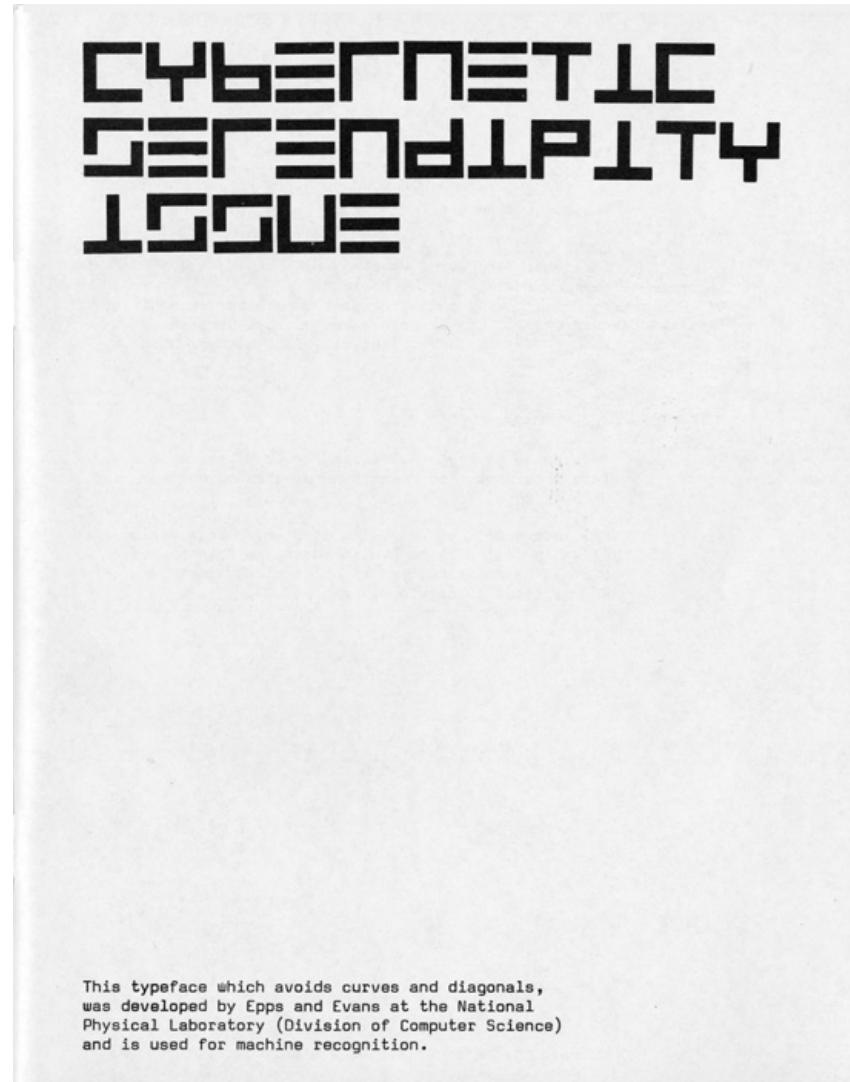
With this information at hand I had more than enough to go on with. So what I have decided to do is

This is an exhibition with a tremendously interesting theme.
Guy Brett, The Times

The Industrial revolution produced the machine age, with the computer comes machine age art.
The Evening News

It is, therefore, a huge pleasure to report that the big machine exhibition at the ICA, Cybernetic Serendipity - is a complete success and well worth its three years planning by Gasia Reichardt. The show provides information which we need, succinctly and entertainingly.
Bryan Robertson, Spectator

And this typeface which avoids curves and diagonals was developed at the National Physical Laboratory and was used for two issues of the ICA magazine with contents related to the exhibition. This was the typeface that was easy for a computer to recognise.

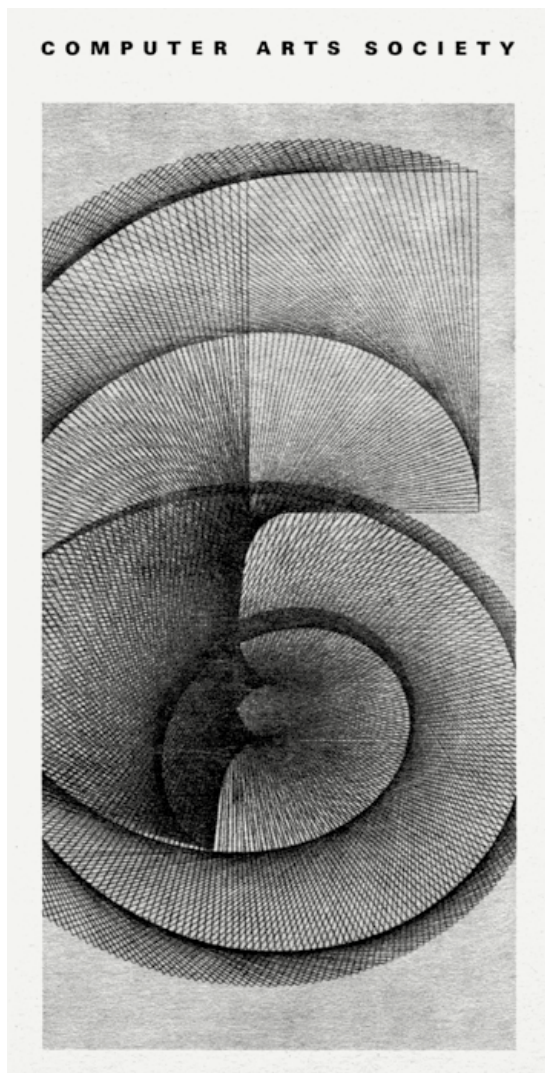


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Soon after *Cybernetic Serendipity* closed in October 1968, interest in art involving technology seemed to wane for some time. Perhaps for nearly as long as 30 years.

The Computer Art Society, whose aim was to encourage the use of computers in the arts, came into being during the time of the exhibition. *Event One*, was an event and an exhibition in March 1969, at the Royal College of Art. The activities of the Computer Arts Society have always embraced new developments in technology and, of course, continue today. Its geographical centre is in Sheffield.

Several years passed after 1968 before artists were able to make computer generated pictures and before art colleges set up computer art departments. One of the first was the Middlesex Polytechnic where the member of the Computer Arts Society, John Lansdown was teaching. Once the time was ripe for artists to use computers, a new tendency gradually developed which aimed to find credible ways to generate images that could convincingly copy nature. What became important were realistic effects even though the subject matter could be imaginary.



It is difficult to forget the ubiquitous teapot which was almost always used as an exercise in generating images that would look solid, in perspective, convincingly lit and sitting firmly on a flat surface. However well it was done, it was always possible to tell that it wasn't a photograph, that the teapot had no existence in the real world.



The teapot belongs to the 1970s. Later, there are different sorts of experiments, unthinkable 50 years ago. This computer graphic by Joan Fontcuberta is from his book *Landscapes without memory* of 2002. He uses computer software that translates two-dimensional maps into three dimensions. In this case there was no map but a painting by Hokusai. The original is on the left and on the right you see how it was interpreted by computer software. It bears little or no relation to the original.



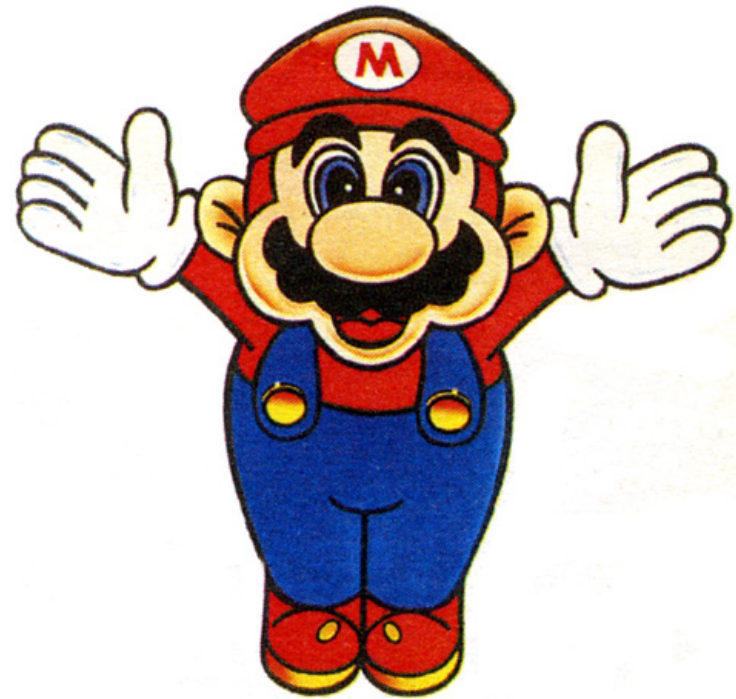
There were many experiments. Harold Cohen developed a program called Aaron in the early 1970s to make drawings with the aid of a moving turtle, on a flat sheet of paper. Initially, the drawings were abstract.



But some 15 years later Aaron's work also gravitated towards realism. In the realm of computer graphics things changed quickly. Here is Harold Cohen with the painting machine. Now, Aaron could paint as well as draw. Some 20 years ago his paint brush is dipped delicately in a pot of paint and the surplus is brushed off. Portraits of people are in proportion and in perspective. Faces are pink, hair is natural, leaves are green. The program was still learning and given paint and paper, Harold intended for Aaron to continue to paint when we are no longer here. That is, of course what Harold Cohen hoped for and even assumed, without considering that we don't really know what Aaron will want to do.



With computer graphics expanding technically and in terms of ideas in all directions, by the 1980s, a new sort of computer animation appeared. The designers of these games were also artists, like Gunpei Yokoi and Sigeru Miyamoto, although a far cry from the Tokyo Computer Technique Group of the 1960s. Their art was to a clearly defined purpose: animation for games.



In the 1980s, also at about that time Telematics arrived on the scene. Artists were sending their art works and their messages via the internet.

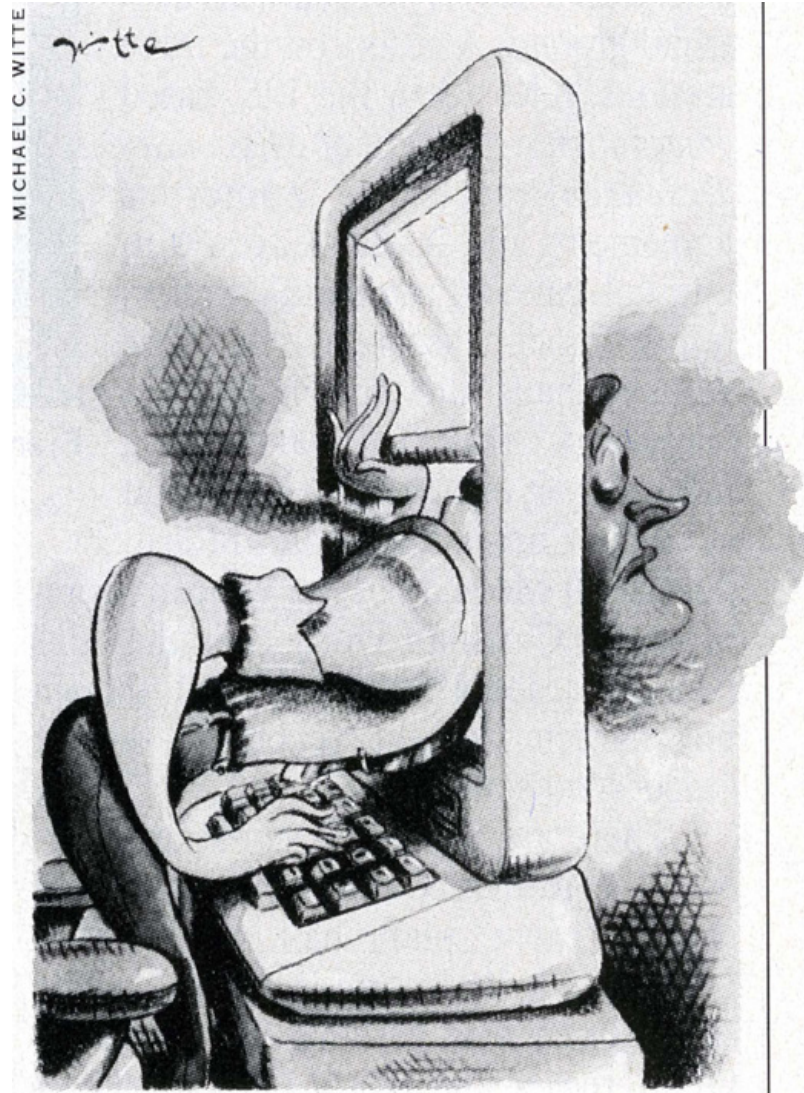


NETWORK



NETWORK

The first important manifestation of that development was organised by Roy Ascott, pioneer in the field, at Venice Biennale in 1986. And this is an example of what at the time, telematic communication could look like, with the viewer collaborating with the computer in creating a work of art.



The virtual reality helmet was not a satisfactory solution to support the illusion of being somewhere or touching something. What we wanted was something seamless that did not necessitate covering our bodies with sensors and wires.



And yet it was trendy enough to be treated as a fashion accessory.



The main difference between computer art of the 1960s, and that created later was that gradually there was nothing to hold, nothing physical. 'There was no paper' as Frieder Nake pointed out. Everything existed somewhere behind the screen: elusive, luminous, and unreachable.



And what about the working parts of the computer itself. There are no cogs and wheels. Computer chips have replaced them and have been replaced. The inside of the computer has failed to become a subject of sufficient interest to be painted. But that is still in the last century.



So what is a computer at the beginning of the 2020s? It seems that it is no longer a personality worthy of a portrait. It is a tool, a piece of furniture, sometimes a fashion accessory. And yet, it is, of course, much more than that. It is a place where we keep our address book, photographs, documents, letters, writing desk, notes, paper and pencil, books, telephone, home cinema, television, library, shop, and pictures. It is a home. And yet this is not precisely evident from its appearance.



The last picture I want to show is a cartoon by Andrzej Krauze, looking at the future. He was thinking of 1994. Today we already know that if computers, that is AI are to make their own art, and I have always hoped that this will happen very soon, neither they, nor their art will look like what we know art to be today. AI would have no reason to copy us, except to pretend to be friendly. Of course, AI is still a child even though such a clever one. Anyway, I hope that for now at least, it will keep its own art a secret.

